Social Incidence of Indirect Taxation in Pakistan (1990 – 2001)

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Award date:
2008

Awarding institution:
University of Bath

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A thesis submitted for the degree of Doctor of Philosophy

University of Bath

Department of Economics and International Development

April 2008

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Dedication

For my mother, Tallat, and my father, Refaqat

Acknowledgments

First of all, I would like to thank Allah Almighty for giving me the opportunity to pursue my dream for a Doctorate Degree. I offer my deep gratitude to Him for having bestowed upon me the strength, dedication and perseverance to undertake such an ambitious project and to complete it. I feel greatly humbled by His blessings and favours upon me.

These acknowledgements would not be complete without the mention of my parents; my mother, *Tallat* and my father, *Refaqat* who have been the source of constant support and encouragement throughout my life. It is very rare for someone from my part of the world, especially a woman, to undertake such an ambitious journey. This would not have been possible without their persistent struggles and sacrifices in life which created for me an opportunity to pursue my dreams. I owe a great debt of gratitude to you *ammi* and *abbu* for being such inspiring role models and for being so generous and loving.

I would like to take this opportunity to thank Commonwealth Scholarship that provided generous funding for this study. Such funding sources open unique opportunities for students from third world countries to enter such world class institutes of learning and for this I will always be grateful. I would also like to acknowledge and thank Mr. David Constable (Mountbatten Memorial Grant) and Mr. William Crawley (Charles Wallace Pakistan Trust) for providing timely and generous funding during the last year of this project.

I would also like to take this opportunity to thank both my supervisors, Professor Andy Mckay and Professor Philip Jones for their constant

encouragement and support and for reposing confidence in me This work could not have been completed without your constant guidance, professional and personal input, so thank you once again.

I must also add and extend a deep appreciation to my mentors, Dr. Abid Aman Burki (Quaidi-i-Azam University, Islamabad, Pakistan) and Professor Peter J. Montiel (Williams College, USA), whose immense love and passion for Economics touched me deeply and made me interested in this field. All this would not have happened without your encouragement and support during my Master's degree, so thank you to you both.

I would also like to extend a special thanks to my friend Saima. Thank you for adding so much colour, laughter and fun in these last few years and for giving me such a refreshing perspective on life and friendship. Furthermore, I would also like to thank my friends, Hari and Ipshita, for our daily coffee and luncheon breaks that made so much difference to the daily routine. Lastly, I would also like to thank Mrs. Samina Bokhari for not only accepting the mammoth task of editing this work at such a short notice but also for completing it seemingly effortlessly and gracefully.

Abstract

This study aims at measuring the social incidence of indirect taxes in Pakistan as a result of the tax reform process specifically carried out in the area of indirect taxes (1990-2001). The intention is to analyze how indirect tax reform reflects the policy objectives particularly in the light of equity and distributional considerations envisaged in the tax reform strategy. Whilst one aim is to reflect on the aggregate indirect tax incidence overtime at the national as well as the urban/rural level, the second objective is to provide a high level of disaggregation of incidence picture in order to explore the sensitivity of tax incidence in terms of key commodities. Additionally, this study attempts to illustrate the sensitivity of *estimated* tax incidence results to the assumption of zero demand responses and to identify welfare enhancing directions of tax reform for Pakistan at the margin by using the marginal theory of tax reform.

The findings of this study seem to indicate that a move from dependence on trade tax revenues to GST/VAT revenues for Pakistan has made the overall indirect tax system a little more progressive. It appears post- reform indirect tax incidence is sensitive to taxation of key commodities including sugar, edible oils and basic fuel/utilities. Incidentally, taxation of these commodities also appears to have strong distributional effects on the poor. Whilst exploring the sensitivity of *estimated* tax incidence results to the incorporation of behaviour responses, our estimated results do not appear to be very sensitive to this incorporation. Furthermore, directions of welfare enhancing tax reform (at the margin) for Pakistan reveal that a reduction in the price of basic food (including beef, wheat, milk and pulses) should be welfare enhancing; taxation of sugar maybe efficient but not equitable, while only taxation of vegetable ghee simultaneously fits both criterion.

List of Abbreviations

CBR: Central Board of Revenue

FATA: Federally Administered Tribal Area

FBS: Federal Bureau of Statistics

GDP: Gross Domestic Product

GNP: Gross National Product

GoP: Government of Pakistan

GST: General Sales Tax

HIES: Household Integrated Economic Survey

IEO: Independent Evaluation Office

IJI: Islami Jamhoori Ittehad

IMF: International Monetary Fund

ITO: Income Tax Ordinance

NFC: National Finance Commission

NTRC: National Tax Reform Commission

NWFP: North Western Frontier Province

PIHS: Pakistan Integrated Economic Survey

PPP: Pakistan People's Party

PSU: Primary Sampling Unit

PTCL: Pakistan Telecommunication Company Limited

RMTRC: Resource Mobilization and Tax Reform Commission

SAF: Structural Adjustment Facility

SAP: Social Action Program

SBA: Stand by Agreement

SBP: State Bank of Pakistan

SIZ: Special Industrial Zones

TRC: Tax Reform Commission

VAT: Value Added Tax

WAPDA: Water and Power Development Authority

WB: World Bank

WHT: With-holding Tax

WTO: World Trade Organization

CHAPTER I: Introduction

1.1 Aims of the study

This study aims at measuring the social incidence of indirect taxes in Pakistan as a result of the tax reform process[1] during 1990-2001, focusing on the area of indirect taxes. The intention is to analyze whether indirect tax reform achieved the policy objectives, particularly in the light of equity and distributional considerations envisaged in the tax reform strategy. Whilst one aim is to reflect on the aggregate indirect tax incidence overtime at the national as well as the urban/rural level, the second objective is to provide a highly disaggregated picture of this incidence in order to explore the sensitivity of tax incidence in terms of key commodities and to isolate their impact on the poor.

The third aim of this study is to illustrate the sensitivity of *estimated* tax incidence results (summarized in terms of tax progression) to the assumption of zero demand responses (a special case of partial equilibrium tax incidence analysis assumed in some tax incidence studies. For instance see Chen et al., 2001; Munoz et al., 2003; and Sahn and Younger, 2003, to name but a few). The fourth aim of this study is to attempt to move beyond the tax incidence analysis by identifying welfare enhancing directions of tax reform for Pakistan at the margin by using the marginal theory of tax reform.

This study focuses on the indirect taxes only (which include sales tax, excise duties and custom duties) because the focus of this research is the tax reforms

[1] Also known as the *first generation of tax reform* process in Pakistan.

(1990-2001) specifically carried out in the area of indirect taxes. Furthermore, this focus should not be a surprise as a substantial amount of total federal tax revenue in Pakistan is raised solely via indirect taxes. For instance, almost 83 percent and 67 percent respectively of total federal tax[2] came from indirect taxes in 1990-91 and 2001-02 respectively. Thus in the case of Pakistan, indirect taxes occupy a central place in the federal tax structure and any serious evaluation of Pakistan tax structure must begin by looking at indirect taxes.

As mentioned earlier Pakistan, like many other developing countries, also embarked on significant tax reforms within the area of indirect taxes, mainly focusing on replacing trade tax revenues with GST/VAT revenues. While revenue mobilization was *the* key factor behind this reform, 'equity' and 'distributional' considerations were the central focus when the overall reform strategy was envisaged. This raises an important question of what has happened in terms of these policy aspirations or in other words, what was the social incidence of this tax reform process. This study will attempt to answer this important question by using the partial equilibrium tax incidence approach while analyzing tax incidence in terms of tax progression using the average progressivity rate.

The analysis holds immense interest for the tax policy and tax reform in Pakistan, as the efficiency and distributional impact of this policy reform has never been systematically studied. But it can also fit a broader perspective as a case study *illustrative* of the *type* of reforms carried out in many other developing countries as well. Thus, this study will attempt to add to a growing but limited research on whether a move from dependence on trade tax revenues to GST/VAT revenues for developing countries has made the tax

[2] Total federal tax figure here excludes surcharges which averaged around 1.6 and 1.2 percent of GDP in 1990-91 and 2001-02 respectively.

system (indirect taxes in our case) more progressive (Gemmell and Morrissey, 2003) or regressive (Emran and Stiglitz, 2005).

It is important to stress that the strength of partial equilibrium tax incidence analysis lies in its ability to disaggregate the incidence picture. This is decisive because such a high level of disaggregation allows us to explore the sensitivity of tax incidence to key commodities and to isolate commodities that may have strong distributional effect on the poor. As a result, this could be extremely useful information for the policymakers and can add to the growing literature on how evidence from tax incidence (in terms of tax progression) can be more informative regarding possible impact on the poor (see for instance Bird and Zolt, 2005).

One of the core concerns regarding evidence emerging from partial equilibrium tax incidence analysis relates to the underlying assumption used to constrain demand responses. This approach assumes that tax levied on a particular commodity is fully borne by those who consume that item. In other words, consumers of the commodity cannot avoid paying the tax on that commodity by changing their behaviour. Although this is a simplifying assumption nevertheless it is a restrictive one. Thus this study will attempt to *illustrate* the sensitivity of the *estimated* results to incorporation of demand responses. We will do this by estimating own- and cross-price elasticities (for a sample of key commodities) for Pakistan using spatial price variations in the (HIES 2001-02) survey data. By doing so, this study will attempt to inform the literature on tax incidence and price elasticities as well.

This study will also attempt to move beyond tax incidence. We aim to do this by trying to identify welfare enhancing directions of tax reform for Pakistan at the margin. For a developing country like Pakistan where one third of the population lives below the poverty line, improving the welfare of the

population in general and of poor in particular is one of the key policy issues. This means a core concern of tax policy in such a country (with respect to the poor) should be "not to make them even poorer" (Bird, 1974; and Mclure Jr., 1977) or to focus on "un-taxing the poor" (Bird and Zolt, 2005). We aim to identify directions of welfare enhancing reforms for Pakistan at the margin using the theory of marginal tax reform (MTR). The practical appeal of this approach for a developing country like Pakistan cannot be exaggerated as policymakers in such countries are keenly interested in empirically robust and theoretically consistent suggestions for improvements in the status quo (Ahmad and Stern, 1987).

1.2 Methodology

The methodological approach followed in this study for the analysis of distributional burden of indirect taxes is a variant of numerical tax incidence approach which was first introduced by Nicholson (1964) for the United Kingdom and Pechman and Okner (1974) for the United States. According to this approach total tax liability for a household is determined by allocating total tax revenue collected on a good to household expenditure shares on that good, until all revenue is fully exhausted. Although this study also calculates tax liabilities based on household (observed) consumption patterns, we make no assumption of proportionality between tax burden and tax revenues as assumed by the earlier studies. In this sense, this is an improvement on the earlier approach as it allows for excess burden and tax evasion.

The data set used for analysis is the Household Integrated Economic Survey (HIES) for (1990-91) and (2001-02) which is a cross-sectional data set collected by the Federal Bureau of Statistics (FBS) Pakistan. This data set is the main source for poverty and inequality estimates for the country. It is a

nationally representative good quality cross sectional data set that has been used extensively (Ahmad and Stern (1987; 1991), Deaton (1987; 1997), Deaton and Grimard (1992), Alderman and Garcia (1993); Malik (1988); Aamjad, et al. (1997); Jafri (1999); Anwar et al. (2005); Kamal et al. (2003); World Bank (1995; 2002); ADB (2006); CRPRID (2003; 2005; 2006). Availability of cross-sectional surveys ten years apart allows us to see how the distributional incidence of these taxes has changed over time. This study will use the most recent survey and will attempt to show information presented in the (HIES) is as relevant for tax policy analysis as it is for carrying out poverty and inequality estimates. Furthermore, it will show how this information can be used for estimating price elasticities and for carrying out tax reform and tax planning analysis.

The advantages of such a micro-analysis are well established. It relies on rich micro information encompassing several thousand households in order to ascertain consumption patterns, demographic characteristics and other household characteristics at the national or more local geographic levels. As a result, even a complicated indirect tax structure like that of Pakistan can be modeled in detail and across various segments of the population. This allows us not only to build an incidence picture at the aggregate level but also to disaggregate the picture in order to see how this incidence is being generated. Such information may be very relevant for the likely impact of *key* taxes on the poor (e.g. taxes on basic fuels, processed food items etc.).

We do accept that the tractability and intuition of partial equilibrium models must be balanced against the 'static' and 'closed' nature of the approach. There is no ideal or unique approach to tax incidence analysis (Martinez-Vazquez, 1991). The superiority of one approach over the other crucially depends on what is being asked. Thus, if the aim of the study is to measure the distributional effect of taxes, partial equilibrium tax incidence approach is

sufficient. More importantly, the partial equilibrium tax incidence approach allows us to clearly disaggregate the incidence picture which as mentioned earlier is the key to analyzing sensitivity of tax incidence for key commodities, and to isolate the effects of commodities that may be having a powerful distributional impact on the poor. All this information is very relevant for the policy makers and key for identifying impact on the poor.

This study also aims at estimating price elasticities using spatial price variation in the survey data (i.e. HIES 2001-02) to estimate demand functions by taking unit values (dividing expenditure by quantities) as proxies for prices. The basic assumption of this methodology hinges on assuming that households belonging to the same cluster face the same prices. Since typically the number of households belonging to the same cluster are in single digits and these households will be interviewed more or less at the same time (in order to minimize time and travel cost), this assumption is quite realistic particularly for rural areas. Nevertheless, unit values are not the same as 'prices' and cannot be directly treated as market prices. But if the appropriate adjustment in unit values can be made, the usefulness of information contained in unit values cannot be denied, particularly for developing countries where price data is so scarce (Deaton, 1988). Thus, this study will attempt to use spatial price variation in HIES 2001-02 data set to estimate price elasticities for Pakistan. This information will in turn be used to *illustrate* the sensitivity of partial equilibrium tax incidence estimates (for a selected sample of key commodities), to incorporation of demand responses as well as to propose directions of welfare enhancing reforms at the margin for Pakistan.

1.3 The plan of the study

This study is organized into eight chapters, each of which is discussed briefly below to provide an outline of discussion. The following chapter begins with a detailed description of factors (both internal and external) responsible for the initiation of the tax reform process in Pakistan. It goes on to give details of the nature and direction of tax reform followed in Pakistan and provides an overview of how the structure of direct and indirect taxes has changed overtime due to this reform process.

Chapter three presents an analytical framework for evaluating the distributional aspects of an indirect tax system. Given the extensive literature on tax incidence for developed and developing countries, this chapter will focus on approaches that are important for developing countries. Furthermore, this chapter will attempt to summarize this evidence of tax incidence in terms of tax progression. Chapter four discusses the data and methodology issues related to the measurement of household welfare aggregate and the analysis of tax incidence.

Chapter five makes up the main body of this study. It establishes the social incidence of the GST/VAT in Pakistan in the pre- and post- reform era (at the national as well as the urban/rural level). The welfare impact of GST/VAT is looked at independently due to the post- reform and future significance of GST/VAT revenue in total federal tax revenues of Pakistan. We also look at the issue of GST/VAT exemptions in order to evaluate if these exemptions are really safeguarding the poor. We use the distributional characteristics of the goods approach to determine goods/services that are relatively more important for the poor and recommend exemptions that are in line with the government's pro-poor agenda.

Chapter six completes the discussion on the indirect tax incidence in Pakistan by evaluating the incidence of overall indirect taxes both pre- and post- reform

(1990 – 2001) (at the national as well as the urban/rural levels). We first look at the methodology and assumptions, then at the social incidence of custom duties and excise taxes respectively. The discussion on the social incidence is completed by bringing all of these components together.

Chapter seven broadens the analysis of tax incidence for Pakistan. This chapter relies on spatial price variation in the survey data to determine price elasticities for 2001-02 along with a detailed discussion of the underlying methodology and data used. Estimates of elasticities are pivotal for moving the discussion forward towards the analysis of tax reform and planning. This chapter also uses this information to evaluate the future direction of welfare-improving tax reforms for Pakistan at the margin using marginal theory of tax reform. Furthermore, this chapter will also try to *illustrate* if our partial equilibrium tax incidence results from the earlier chapters are sensitive to the incorporation of demand responses.

The final chapter concludes the study. Along with summarizing the major findings, the intention is to broadly talk about the importance and main contributions of this research. Furthermore the chapter also provide a brief discussion on the qualifications to this work and highlights areas of possible future research.

CHAPTER II: Taxation in Pakistan (1985 – 2001)

2 Introduction

Pakistan's tax system has undergone profound changes since the nineties, but despite these changes tax revenue in relation to GDP has remained remarkably stable over the last two decades (see Table 2.1). Federal tax revenue as a percent of GDP during the last two decades averaged around 13 percent never falling below 10 percent of GDP (International Monetary Fund, 2001). The overall revenues still appear to be dominated by revenues collected by the federal government (see Table 2.2) and these mainly comprise direct taxes (income and corporation tax) and indirect taxes (custom duties, sales tax and excise duties).

The purpose of this chapter is to analyse the structure of the country's federal taxation in conjunction with the reform process, also called the *first generation of tax reform*s, that took place during the 90s in Pakistan. The main focus of this reform process was to impose direct taxes as well as replace trade revenues with GST/VAT revenues. This process approximately ended in 2001. And shortly after, Pakistan initiated the *second generation of tax reforms* which are purely administrative in nature and are *not* the focus of this study.

This chapter will try to address the following questions:

(a) What were the internal and external factors that impelled the tax reform process in Pakistan?

(b) What was initially envisaged regarding the nature, shape and scope of these reforms, and more importantly, whether this vision translated into policy actions or not?
(c) Who envisaged these reforms?
(d) How have the overall federal tax structure and its components changed during the reform process and what were the major reform steps?
(e) Were equity concerns considered under the overall reform strategy and within its components? And did these concerns translate into respective policy actions?

For this purpose, this chapter is divided into four main sections. The first section addresses the question of why tax reforms were initiated in the first place in Pakistan during the decade of the 90s. The second section talks about the overall nature and direction of the tax reform process as foreseen by the Resource Mobilization and Tax Reform Commission (RMTRC). The third section is divided into several subsections; each analyzing major changes that took place in each component of the federal taxation (namely income tax, custom duties, sales tax and excise duties) due to this reform process and the last section concludes the discussion.

Table 2.1: Fiscal Indicators of Consolidated Federal and Provincial Governments (as Percent of GDP)

Year	GDP Real Growth	Overall Fiscal Deficit	Expenditure			Revenue		
			Total	Current	Dev.	Total Rev.	Tax	Non-Tax /1
1980-81	6.4	5.3	22.9	13.7	9.3	16.9	13.5	3.4
1984-85	8.7	7.7	24.7	17.9	5.5	16.4	12.2	4.2
1987-88	6.4	8.5	26.7	19.8	6.9	17.3	11.9	5.4
1989-90	4.4	6.5	25.7	19.3	6.5	18.6	12.8	5.8
1990-91	5.4	8.8	25.7	19.3	6.4	16.9	12.7	4.2
1991-92	7.6	7.5	26.7	19.1	7.6	19.2	13.7	5.5
1992-93	2.1	8.1	26.2	20.5	5.7	18.1	13.4	4.7
1993-94	4.4	5.9	23.4	18.8	4.6	17.5	13.4	4.1
1994-95	5.1	5.6	22.9	18.5	4.4	17.3	13.8	3.5
1995-96	6.6	6.5	24.4	20.0	4.4	17.9	14.4	3.5
1996-97	1.7	6.4	22.3	18.8	3.5	15.8	13.4	2.4
1997-98	3.5	7.7	23.7	19.8	3.9	16	13.2	2.8
1998-99	4.2	6.1	22.0	18.6	3.4	15.9	13.3	2.7
1999-00	3.9	5.4	18.7	16.5	2.2	13.5	10.7	2.8
2000-01	1.8	4.3	17.2	15.5	1.7	13.3	10.6	2.7
2001-02	3.1	4.3	18.8	15.9	2.9	14.2	10.9	3.3
2002-03	4.7	3.7	18.6	16.3	2.3	14.9	11.5	3.4

Source: Economic Survey of Pakistan (various years).
Note: The base of Pakistan's GDP has been changed from 1980-81 to 1999-2000, therefore, wherever GDP appears in denominator the numbers prior to 1999-2000 are not comparable.
* Expenditure figures do no include the impact of earthquake spending in this table
1/ Non-tax revenue also include surcharges on petroleum and as and self financing by autonomous bodies.

Table 2.2: Structure of Federal Tax Revenue[3]

Year	Tax Revenue				Break-up of Indirect Taxes		
	Tax Revenue (CBR) /1	As % of GDP	Direct Taxes	Indirect Taxes	Custom	Sales	Central Excise
1985-86	72.4	14.1	10.3 [14.2]	62.2 [85.9]	29.3 (47.1)	4.90 (7.9)	15.6 (25.1)
1987-88	93.5	13.8	12.4 [13.3]	81.0 [86.6]	38.0 (46.9)	8.7 (10.7)	17.6 (21.7)
1989-90	119.4	14.0	15.7 [13.1]	103.7 [86.9]	50.7 (48.9)	15.6 (15.0)	23.3 (22.5)
1990-91	111.0	11.0	20.0 [18.0]	91.0 [82.0]	50.0 (54.9)	16.0 (17.6)	25.0 (27.5)
1994-95	226.0	12.0	62.0 [27.4]	164.0 [72.6]	77.0 (47.0)	43.0 (26.2)	44.0 (26.8)
1995-96	268.0	13.0	78.0 [29.1]	190.0 [70.9]	89.0 (46.8)	50.0 (26.3)	51.0 (26.9)
1996-97	282.0	12.0	85.0 [30.1]	197.0 [69.9]	86.0 (43.7)	56.0 (28.4)	55.0 (27.9)
1997-98	293.7	11.0	103.3 [35.0]	190.4 [65.0]	74.5 (39.1)	53.9 (28.3)	62.0 (32.6)
1998-99	308.5	10.0	110.4 [35.8]	198.1 [64.2]	65.3 (33.0)	72.0 (36.3)	60.8 (30.7)
1999-00	346.6	9.1	112.6 [32.5]	234.0 [67.5]	61.6 (26.4)	116.7 (49.9)	55.6 (23.7)
2000-01	392.3	9.4	124.6 [31.8]	267.7 [68.2]	65.0 (24.3)	153.6 (57.4)	49.1 (18.3)
2001-02	403.9	9.2	142.5 [35.3]	261.6 [64.7]	47.8 (18.3)	166.6 (63.7)	47.2 (18.0)
2002-03	460.6	9.6	148.5 [32.2]	312.2 [67.8]	59.0 (18.9)	205.7 (65.9)	47.5 (15.2)

Source: Central Board of Revenue

* Beginning from 1999-2000, Pakistan's GDP was re-based at 1999-2000 from a two decades old base of 1980-81. Therefore, wherever GDP appears in denominator the numbers prior to 1999-2000 are not comparable.

Note: Figures in square bracket are as percentage of tax revenue. Figures in parentheses are as percentage of indirect taxes.

1/ in billions of PRs.

[3] Figures of tax revenue from Table 2.1 and 2.2 do not match because formal include both federal and provincial governments while latter only includes the federal government.

2.1 Why Reform?

The main forces behind the tax reform process - also known as the *first generation of tax reforms* - can be analysed in terms of internal factors (e.g. the economy and politics) as well as external factors (e.g. the Gulf war, International Monetary Fund programmes etc) and these are discussed in detail below.

2.1.1 Internal factors

2.1.1.1 Economic Factors

At the time of the initiation of the tax reform process, several economic factors dictated the need for serious tax reforms in Pakistan. In order to understand this phenomenon the country's economic history over the last 30 years needs to be taken into account, Pakistan's economic history can be broadly categorized into two periods. During the first period which started in 1970 and lasted until the middle of the 1980s, Pakistan enjoyed an impressive growth performance six-seven percent per annum). Although fiscal and external imbalances were not significant at the beginning of this period by the end of this period significant imbalances appeared to emerge.

The second stage can be marked from the middle of 1980s till the end of 2000 during which the growth process started to fade away and ballooning of fiscal and current account deficits led to serious deterioration of the debt situation of the country (Independent Evaluation Office, 2002). For instance, in (1977-78)

debt servicing payments (as a percentage of net revenue receipts) were only 19 percent but by the end of 1980s these had ballooned to 42 percent. Much of the problem according to Pasha et al. (1992) arose from the mounting share of current expenditures, which remained in excess of 19 percent of GDP between 1985-93 as a result of dramatic increase in debt service payments. Together with military expenditure, these accounted for 80 percent of current expenditures.

Another important economic change which took place during the second period were the changes in revenue sharing transfers from federal government to provincial governments through the National Finance Commission (NFC) Awards[4] (see Table 2.3). In May 1991, the sixth NFC award took place after a span of 12 years. The May 1991 NFC award significantly increased revenue-sharing transfers to the provinces. This was made possible by including excise duties on tobacco and tobacco manufacturers and sugar in the divisible pool of taxes. On the whole, the 1990 NFC award increased the total federal transfers to the provinces in (1991-92) by PRs. 25 billion,- an increase of 2.1 percentage point in terms of GDP. This put significant additional pressure on an already dwindling fiscal stance.

[4] The National Finance Commission is a constitutional body which is required to meet every five years to make recommendations on the distribution of financial resources between provinces by the federal government.

Table 2.3: Total Federal Transfers to Provinces (under various revenue sharing NFC awards)

	Divisible Pool Transfers to Provinces (Mill. Rs.)	Divisible Pool Transfers as % of Fed. Tax Rev*.
Raisman Award	26,750	12.8
NFC (1961-62)	48,015	23.1
NFC (1964)	56,183	27.0
NFC (1970)	69,628	33.4
NFC (1974)	62,028	29.8
NFC (1990)	73,528	35.3

* Gross Revenue including cost of collection

Cited: Table 2, Implication of the New National Finance Commission, SPDC Report, July 1995.

The government of the time was not oblivious to these problems: it did try to create some fiscal space on the side of expenditures, but in the face of inflexible structures of expenditures (inelastic interest payments and large share of military expenditure) the sacrifice had to come from severe cuts in development and social spending for example development and social spending was 10 percent of GDP in 1992 and this fell to 4.5 percent by 2000) (Independent Evaluation Office, 2002). As a result, the inflexible and changing nature of expenditures meant that more revenues needed to be found urgently.

One possibility was to rely on the existing tax structure to generate additional revenues. But given the low resource mobilization potential under the current system, this was hardly a viable option. For instance, if we look at Table 2.4 we can see that the elasticity of tax to GDP ratio for the last three decades beginning 1970, which also reflects the efficiency of the tax system, remained around 0.80 thus implying inelasticity of the tax system. This stagnant ratio meant that for every 10 percent increase in GDP, federal taxes under the existing tax structure could only increase by eight percent, since the overall efficiency of the tax system depends on the buoyancy (i.e. built-in flexibility of tax system and it should be elastic with respect to the base, so that increase

in GDP can automatically lead to proportionate increase in tax revenue) of its components. Looking at the same table we can see that the buoyancy of various tax components (excluding the sales tax) was also quite low (Pasha et al., 1992). This implies that the given tax structure as it stood suffered from serious revenue mobilisation problems.

Table 2.4: Elasticity and Buoyancy of Major Federal Taxes, 1972-73 to 1989-90

Tax		Tax Base	Tax / Base	Base / Income	Tax / Income
Income Tax		Non-Agriculture GDP			
	Elasticity		0.88	1.07	0.95
	Buoyancy		1.00	1.07	1.07
Import Duties		Value of Imports			
	Elasticity		0.67	1.06	0.69
	Buoyancy		1.00	1.06	1.06
Excise Duties		Value Added in Large Scale Manufacturing			
	Elasticity		0.57	1.15	0.66
	Buoyancy		0.78	1.15	0.89
Sales Tax		Value of Import + Industrial Production			
	Elasticity		0.96	1.05	1.01
	Buoyancy		1.20	1.05	1.26
All Federal Taxes		Gross Domestic Product			
	Elasticity		0.80	1.00	0.80
	Buoyancy		1.07	1.00	1.07

Source: Qazi Masood and Mohammad Akbar, 'Elasticity and Buoyancy of Federal Taxes', AERC Working Paper, 1991.

2.1.1.2 Political Factors

The tax reform process of Pakistan (1990-91) did not arise out of purely economic consequences. There were significant political changes that led to the initiation of the *first generation of tax reform* process in Pakistan. The period of (1990-91) coincided with the induction of the newly elected

Government of Islami Jamhoori Ittehad (IJI) led by Mian *Nawaz Sharif* in November 1990. This event was a catalyst for reform process as *Nawaz Sharif* (contrary to his predecessor Benazir Bhutto[5]) was a capitalist, a political moderate and member of a leading industrial family. The IJI had a strong industrialist hold and enjoyed thriving urban support. And the party was elected with the specific goal of strengthening the economy which included reforms in areas of privatisation, deregulation, denationalization, foreign exchange and payment, taxation, administration and law. All this made the IJI government more forward looking and responsive to the needs of the private sector.

This, coupled with the macroeconomic pressure created by the Gulf War, (which will be discussed later) made *Nawaz Sharif*'s government more eager to pursue reforms. The seriousness of the commitment to reforms, particularly in the area of taxation, can be seen from the fact that within a few months of the formation of the new government, the IJI government created a high profile Tax Reform Committee (TRC) which was followed by the establishment of the Resource Mobilization and Tax Reform Commission (RMTRC) in February 1991. This commission was created with the purpose of outlining a revenue mobilization strategy as well as improving tax laws and procedures[6]. It would be no exaggeration to add that role of RMTRC in formulating the direction and nature of tax reform process in Pakistan was pivotal.

2.1.2 External Factors

[5] Benazir Bhutto is the lifetime chairperson of the Pakistan People's Party (PPP). The previous government was held by PPP with Benazir as prime minister. The PPP enjoys support in the rural areas of Pakistan.
[6] RMTRC's terms of reference as suggested by an open letter to Prime Minister (August 28, 1994) by the RMTRC.

It will be too naïve to say that Pakistan's *first generation of tax reform* process was initiated only due to internal pressures. There were some significant external forces as well that helped initiate the reform process.

2.1.2.1 Gulf War

The Gulf war started in August 1990. Although Pakistan was not a direct stakeholder in this war, it indirectly put a lot of stress on government finances particularly on the budget and the balance of payments. According to Pasha et al. (1992) the cost of the Gulf war to the Government of Pakistan (GoP) is estimated at around PRs. 3 billion. This cost was incurred because of: (a) a higher oil import bill (over $600 million): (b) a decline in home remittances from Kuwait and Iraq (approximately $180 million); and (c) a decline in custom duties due to an export decline (PRs. 2 billion). These factors caused the budget deficit for (1990-91) to swell up to a historic high level of 8.8 percent of the GDP and also resulted in a jump in inflation from six to 13 percent. This resulted in a severe macroeconomic shock for the government (Pasha et al., 1992).

2.1.2.2 International Monetary Fund

From (1988-2001) Pakistan has been involved with seven different International Monetary Fund (IMF) programmes, four of which were short term and three multi-year arrangements (Independent Evaluation Office,

2002). The balance of payment crisis triggered by the Gulf war (as mentioned earlier) forced the government to borrow again from the IMF, initially under a one-year Stand-by Arrangement (SBA) that started in September 1993[7].

There is no doubt about the fact that various IMF programmes brought significant structural adjustment reforms in the areas of tariff liberalization, and GST broad-basing that were similar in features to IMF reform programmes in other developing countries. As a result, these programmes were important to the interlocking tax reforms agenda within the economic agenda of various Pakistani governments during the decade of the 90s. However, it must be added that the IMF support role in the design and implementation of reform process was particularly significant in the design of GST/VAT taxation. This is also noted by the (Task Force on Tax Administration, 2001) according to which "(like) many developing countries the technology of VAT was transferred to Pakistan as a part of IMF stabilisation programme. It was exported and implemented in light of its advantages, i.e. in terms of "revenue buoyancy, a broad base consisting of most goods and services, neutrality as concerns both domestic and international trade and difficulties of evasion".

What is most noteworthy about the decade of the 90s is that it was the most politically unsettling decade, or the decade of *institutional decay* (Hussain, 2004). Between 1988-2001, nine different governments came to power. Thus, what is remarkable and must be acknowledged is that despite political upheavals and government shuffling, the tax reform agenda managed to stay and run its course. The only plausible explanation for sustaining the reforms at such a time (in a country where these reforms have been aborted many times

[7] Immediately before this, Pakistan had had two unsuccessful programs with the IMF. The first was a three-year Structural Adjustment Facility (SAF) signed on Dec. 1988. The second was a year-long SBA arrangement which started in Dec. 1988. The first programme was completely aborted with zero funds withdrawn, while only 29 percent of total disbursement was withdrawn in the second arrangement.

for lesser reasons) appears to be the balance of payment crisis, the acute need for revenue mobilization and the IMF push factor.

2.2 Nature and Direction of Tax Reforms

After having discussed the factors (both internal and external) that forced Pakistan to undertake the tax reform process, it is equally important to understand why these reforms took this particular form and shape and what was responsible for this. In this regard, the role of the Resource Mobilisation and Tax Reform Commission (RMTRC) is pivotal and will now be discussed in detail.

The Tax Reform Committee (TRC) (as mentioned earlier) was formulated early in 1990 by the government of *Nawaz Sharif*. However, while the TRC was mandated to undertake a comprehensive look at the current situation and identify bottlenecks, it lacked the powers to implement the identified reform process. The issue of dealing with the tax reform process was taken a step further with the establishment of the Resource Mobilization and Tax Reform Commission (RMTRC) in February 1991. The RMTRC was created with the purpose of not only outlining a revenue mobilization strategy and recommending improvements in tax laws but also for implementing these improvements.

The commission was different from earlier committees and commissions of a similar nature, since it was mandated to work as an advisory group in close liaison with the Central Board of Revenue and the Ministry of Finance[8]. And

[8] The Resource Mobilisation and Tax Reforms Commission Report, Government of Pakistan, August 1994.

by creating the RMTRC, the government had effectively bypassed the tax department by giving the responsibility for development of proposals and implementation of strategies (via provisions in the Finance Bills) to the RMTRC. The actual collection responsibilities were also shifted to the large public sector and corporate entities (Pasha, 1995).

The RMTRC term of reference include [9]the following objectives:

a. To assist with the implementation of the recommendations of the Tax Reform Committee
b. To bring structural reforms in the following area(s):
    i. Excise Taxation by developing a workable capacity.
    ii. (to) Establish a fixed, or presumptive, tax system in direct taxes.
    iii. (to) Restructure the Custom Duties Collection system.
    iv. (to) Broaden and increase the tax base.
c. To improve the overall tax system with the view of minimising discretion and simplifying procedures etc.
d. To formulate other steps that can improve the federal and provincial finances.

According to the RMTRC final report (1994) the basic objective of the tax reform process was to generate bigger tax resources while the motivation for the proposed reform was the acknowledgement from the government that it was facing a serious budgetary problem and that there was an urgent need to finance that burden. The RMTRC was of the opinion that the government was also aware that the best way forward was to increase revenues via domestic taxation as other sources of financing (such as seignorage revenue, internal and external borrowing) at this time were of limited use or had already been utilized to the maximum possible.

[9] Ibid.

Although, revenue mobilisation was at the core of the tax reform agenda, there was an understanding that the resultant tax structure must be efficient, administratively feasible as well as equitable. And this was mentioned in numerous places in the Commission's main report i.e. RMTRC (1994). For instance:

- "…..above all it is also sought to provide a long-term vision of an efficient and *just* taxation system"[10].

- "….while giving due weight to the difficult problem of implementability, the Report does not lose sight of the central objectives of public policy, i.e. economic efficiency, equity and macroeconomic stability—and of the fact that the ultimate purpose of any meaningful tax reform is to raise the economic well being of the people, especially that of the least privileged in the society".

- "The central objective of the tax reforms is to raise bigger resources than the pre-reform situation so that the large budgetary deficits can be reduced in such a manner that the maxims of efficiency and equity are met…"

- "While recognizing multiplicity of the sources of financing for public expenditure…the report regards taxation to be the basic instrument of public policy which alone is consistent with efficiency and equity".

- "In the field of indirect taxation, the basic objective is to move away from trade taxes to domestic taxes in an offsetting manner to prevent a

[10] This one is taken from the open letter to the prime minister by RMTRC, Aug. 28, 1994.

reduction in public revenue while greater efficiency is achieved….The pursuit of these objectives will involve carrying out tariff reform, which aims to reduce the dispersion of the rates of nominal tariffs and to lower the nominal and effective rates of import tariffs, partly to simplify the tax laws and partly to discourage smuggling activity. Furthermore, a broad based value added tax imposed at the consumption stage should be introduced. And, an effort should be made to make indirect taxation relatively more equitable by a highly selective exemption of basic necessities, which are mainly consumed by the poor, and by taxing luxuries at a higher rate. However, it should be understood that indirect taxation is basically inequitable; it is no substitute for a properly designed system of direct taxation"

- However, in several other places in the Commission report, there is also confusion and doubt about whether equity and efficiency goals can be met simultaneously. For instance:
  "….(although) there is an inevitable trade-off between objectives; but in Pakistan's present situation, what is equitable is also efficient"

Thus, it is not an exaggeration to imply that the RMTRC vision of tax reform for Pakistan included delivering a tax structure that would not only be revenue enhancing but one which would also encompass equity as a central pillar of reform process along with efficiency and administrative ease.

2.3 Trends in Pakistan's Public Finance: Before and After the Tax Reform process

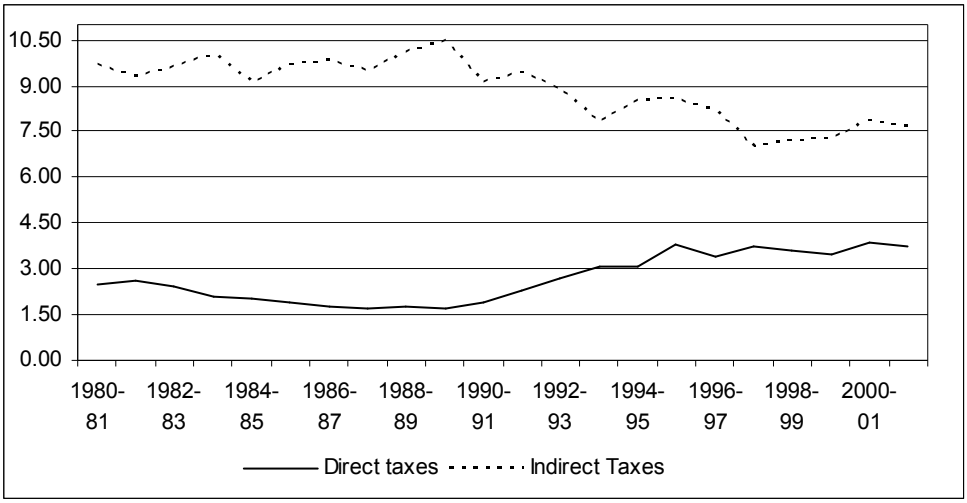
2.3.1 Direct Taxes[11]

Pakistan's direct tax regime mainly comprises income and corporation tax[12], which together constitute 90 percent of the total direct taxes. This discussion therefore will only focus on these two components.

If we look at Figure 2.1, we can see that the contribution of direct taxes within total revenues over the years has been minuscule when compared to the share of indirect taxes within federal revenues. For instance, between 1980 to 1990 direct tax shares averaged no more than two percent of GDP. According to the IMF (2004), this was primarily due to a narrow base, non-compliance and abundant use of tax concessions[13]. If we look at Figure 2.1 we can clearly see that the most significant increase in the share of direct taxes share came during the initial period of tax reform i.e. (1990-95) when direct tax share as a percentage of GDP increased to a historic high of 3.8 percent and by the time reforms ended, it had more or less steadied around this level. Thus on the surface it appears that a significant increase in direct tax revenues took place. But the real question is, how this increase was made possible.

[11] The discussion on direct taxes has been purposely kept brief since the focus of this research is indirect taxes.
[12] For the purpose of income taxation, income is classified into six broad categories including salary, interest on securities, income (from house or business or profession), capital gains and income from other sources.
[13] Pakistan's economy has a large informal sector estimated to be around at least a quarter of GDP. Additionally, service and agriculture sector representing 52 and 23 percent of GDP are taxed nominally (International Monetary Fund, 2004).

Figure 2.1: Pakistan Tax Revenue (1980-01) as percentage of GDP



According to Pasha (1995), at the start of the reform process the government was aware that for reforms to be successful this time around, the income tax department - which was also the main stakeholder - needed to be bypassed. The corruption of income tax officials and the humiliation suffered by tax payers at the hands of tax officials were no big secret as these problems had already been highlighted in an earlier National Tax and Reform Commission (NTRC, 1986) report (known as the 'Qamar-ul-Islam'). The Qamar-ul-Islam report repeatedly stressed the need to create an atmosphere of *mutual trust* and *cooperation* and took serious note of *indignity* and *humiliation* faced by tax payers and the *high handed behaviour of tax officials*. According to this report, these problems were the most critical factors behind the underperformance of direct taxes and as a result this report called for "….simplifying the existing procedures and reducing occasions when the tax payers and the tax official came into contact with each other" (NTRC Final Report, 1986). Taking a serious note of NTRC (1986) report findings, the government bypassed the income tax department by setting up the RMTRC as the main body of reform, which was empowered to set up the strategy for revenue mobilisation and was also given powers to implement this strategy.

The direct tax reform process came in two phases: the first phase (1990-95) and the second one (1995-2000). The first phase included:

a. Development of Withholding Taxes (WHT)[14] or presumptive tax regime.
b. Reduction in tax rates.

As a consequence, the first stage facilitated the reform agenda by immediately incorporating steps that were revenue enhancing (i.e. WHT) and also effectively bypassed the income tax department as the collecting agent. The commission was aware that increasing the direct tax revenue in this manner was *not* the best way possible. But given the serious administrative bottlenecks, this was perhaps the *only* way to move forward at this time.

Thus, if we look at Figure 2.1 we can see clearly that much of the increase in direct tax share during the reform process came during the first phase of reforms. According to the (International Monetary Fund, 2001; Pasha, 1995; Khan, 1997) the factor responsible for almost the *entire* increase in the direct tax collection over the decade of 1990 has been the steady expansion of the WHT collection regime. And this can be more easily identified if we look at Table 2.5 which classifies income tax revenues into its three components[15]. The contribution of WHT in the total income tax revenue in (1990-91) was only 47 percent; by (1995-96) this had jumped to a staggering 64 percent and by the end of the reform process had dropped to 53 percent. While *collection*

[14] Section 50 of Income Ordinance of Pakistan, 1979, contains the provisions for payment of tax before assessment. It is called deduction at source and commonly known as *withholding tax* (WHT), (Choudhry, 2001).

[15] Income tax components include: (a) *Collection on demand* refers to collection made through audit; (b) *Voluntary payments* are made on five different dates i.e. each quarter of the income year on the basis of anticipated annual income and final payment at the time of annual return of income; (c) *Withholding Taxes* (WHT) are essentially in the nature of advance tax payments (or essentially deduction at source) and very similar to the indirect taxes (since their payment constitutes a final discharge of tax liability).

on demand (which actually reflected the department's own effort) was only 22 percent in (1990-91), this declined to a historic low of 13 percent by (1995-96) and to a mediocre 16 percent by the end of the reform process. The third component i.e. *voluntary payments* failed to offset the decline in *collection in demand* over the years, thus representing another administrative failure.

Table 2.5: Components of Income Tax (as % of total income tax)

Components of Income Tax (as a percentage of total income tax)				
	1990-91	**1995-96**	**1998-99**	**2001-02**
Collection on Demand	22 %	13%	16%	15%
Payment with Return	31 %	23%	18%	33%
Deduction at Source (WHT)	47%	64%	66%	52%

Source: Author's own calculation using CBR Year Books.

As described earlier the first phase of direct tax reform process included two main steps: (a) extension of the WHT regime; (b) reduction in tax rates (for instance see Table 2.7). The major policy shift came during the reform process when the government (through the Finance Bill in 1991) for the first time announced a tax rate reduction path for the next five years. The main aim was to facilitate investors and to make the future timeline known so as to remove uncertainty related to tax rates. The strategy was to ultimately reduce all the top rates by (1997-98), including the individual maximum income tax rate to 35 percent; for banking companies the reduction was envisaged from 66 percent to 55 percent; for public companies 44 percent to 30 percent and for other companies from 55 percent to 40 percent. By end of the decade of 1990s the rates stood at 58 percent for banks, 47.3 percent for private companies, 45.2 percent for public companies, 38.5 percent for individuals and 30 percent

for individuals with salary-based incomes (International Monetary Fund, 2001; Pasha, 1995).

The second phase of direct tax reform started in the middle of 1990s and was aimed at addressing serious structural weaknesses in the direct tax system. According to the RMTRC (1994) the main reform components included:

1. Expanding the tax net by including other activities particularly agriculture, capital gains, services, and informal sector.
2. Eliminating all or most of the tax expenditure and tax holidays.
3. Moving away from the presumptive taxes to more adequate and systematic taxation of personal and corporate incomes.

It has to be admitted that the agenda for the second phase of income tax reform was much more complicated as it tried to address issues of reform in order to have a long-term impact on revenues rather than the short-term revenue mobilisation achieved under the first phase. But reforms during the second phase at best remained partial. For instance, although the commission did highlight the imperative to extend and broaden the income tax base by bringing in agriculture income and corporate gains within the tax net, the government found it very hard to carry this through due to political reasons.

In conclusion, direct tax reforms were able to bring an immediate increase in tax revenues but most of the increased tax revenue came from the expansion of the withholding taxes. For instance, in 1990-91, direct taxes were contributing around 1.9 percentage of GDP, this increased to 3.8 percent in 1995-96 and settled down to 3.7 percent towards the end of decade. Since

revenues by WHT are not progressive, this did not add much needed progressivity to direct taxes.

Also the envisaged progressivity of the direct tax system failed to materialize as the broadening of direct taxes and the expansion supposed to address the structural features of the direct tax regime (such as agriculture tax and corporate profits etc.) failed to materialize. Thus, even though revenues increased in the short run, the direct taxes performance in the long run remained lacklustre at best. We can say that the resultant direct tax structure failed to adequately address the concerns envisaged by the commission regarding enhancing the progressivity of direct tax system. This makes distributional concerns related to the incidence of indirect taxation even more important because in the case of Pakistan we can no longer rely on the conventional wisdom of addressing progressivity issues via direct taxes only.

2.3.2 Indirect Taxes

Pakistan's taxation policy over the years can be marked with excessive reliance on indirect taxes. For instance if we look at Table 2.2 we can see that in (1990-91) almost 82 percent of total federal tax revenues came from indirect taxes. By the mid-1990s, indirect taxes contribution to total federal taxes slightly reduced to 73 percent and by the end of reform process, indirect taxes were contributing around 65 percent of total federal taxes. Not only has the contribution of indirect taxes to the overall federal taxes been changing, but a significant change has taken place in terms of how this revenue is being generated. For instance, in 1990-91 almost 55 percent of total indirect taxes were coming from custom revenues followed by excise and sales tax at 28 and 18 percent respectively. During the middle of the reform process (1995-96),

even though custom duties still remained the dominant source of indirect tax revenues, this contribution had declined to 47 percent while excises and sales tax were both contributing around 26 percent respectively. However, by the end of the reform process, revenues from GST had surpassed all the other sources. For instance, in 2001-02 GST was contributing an unprecedented 64 percent of total indirect tax revenues followed by both customs and excises at 18 percent each. Thus, we can see a remarkable change in how the indirect tax revenues were being generated over time and this is discussed in the following sections.

2.3.2.1 Custom Duties [16]

It would not be wrong to say that Pakistan's tariff and trade reform process started much earlier than the 1990s and it can be divided into two main phases. The first phase of import liberalization was initiated in the middle of the 1980s with recommendation from National Tax Reform Commission (NTRC), (1986) which lasted about ten years and the second phase of reform process started in the middle of 1990s with the establishment of Tariff Reform Commission (TRC) in 1996 which lasted until 2001-02.

Historically, import taxes in Pakistan were primarily raised for revenue generation and to promote industrialization based on import substitution policy. As expected, this policy resulted in a large-scale diversion of resources and created a strong anti-export bias by creating extremely high and distorted

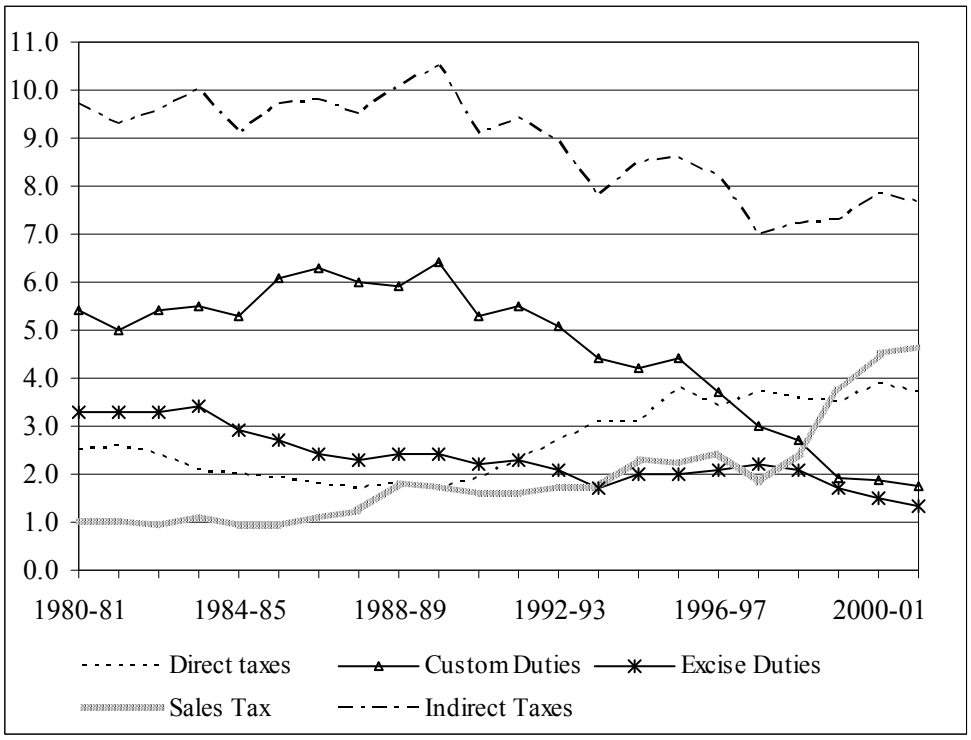
[16] Since import tariff and non-tariff barriers are the prime source of custom duties, discussion here only focuses on these taxes.

tariff structure that led to rampant smuggling and inefficient resource allocation[17] (Pasha, 1995).

After 1990, there was a major policy shift in trade policy toward trade liberalization and tariff reform was deemed essential for reducing protection in the import-substituting industries, as well as for encouraging export promotion and reducing smuggling (RMTRC, 1994). Furthermore, compared to the first phase of reform, this phase was *not* envisaged to be revenue neutral as it was seen as a part of the overall tax reform strategy where revenue loss from the declining importance of trade taxes would be compensated by the increasing importance of domestic tax; GST/VAT (RMTRC, 1994). Thus, as a result of this reform process, tariff revenue contribution as a proportion of indirect taxes exhibited a steep decline during the decade of 1990s (World Bank, 2004). For instance, tariff revenue as a percentage of indirect tax declined from around 46 percent in 1990-91 to only 15 percent in 2001-02. However, these tariff cuts were not offset by an increase in the share of imports to GDP which maintained more or less the same trend (World Bank, 2004). As a result, tariff revenue as a share of GDP also fell from around 5 percentage of GDP in 1990-91 to 1.7 percent in 2001-02 (also see, Figure 2.2).

[17] These issues have been discussed in preceding paragraphs.

Figure 2.2: Pakistan Major Tax Components (1980-01) as percentage of GDP



a. First phase of custom duty reform (1986-1995)

Pakistan pre-reform custom duty structure suffered from very high rates and a narrow base. The tariff structure was highly dispersed. For instance, in the middle of the 1980s, the structure of ad valorem tariff rate ranged from 10 to 350 percent. There were 17 different duty slabs; almost 40 percent of imports were facing 0-10 percent, 32 percent import under 10-50, 22 percent import under 50-100, and 0.6 percent import under 100 plus percent tariff slab (NTRC, 1986).

A large number of imported items were also under quantitative restrictions (QR) with an equally large number of items placed on an exhaustive *negative list* (i.e. items subject to import ban/quantitative restrictions). For instance, in 1984-85, there were almost 1,000 items on the *negative list*: 22 percent items classified as totally prohibited; 16 percent as partially prohibited and 10 percent as restricted items (NTRC, 1986).

The underlying tax base was very narrow due to a plethora of exemptions/concessions that existed on the basis of type of end use, geographical location or nature of importer. For instance, in 1984-85 despite high rates, duty free imports made up almost 45 percent of total imports in the country!

Thus, high tariff rates with a narrow tax base meant that tax rates had to be further raised in order to meet the revenue requirements. This was done by the

introduction of para-tariffs[18] (for instance, see Table 2.9). However, this cascading effect was leading to even higher tariff rates that was not only increasing the cost of imported items but also creating other unintended distortions in the economy (such as smuggling[19], misreporting of imports etc.) (NTRC,1986).

Table 2.6: Para-tariffs (in percentage): A Brief Overview

	Import Surcharges	**IQRA surcharge**[20]	**Import Licensing fee**	**Total**
1980-81	0	0	2	2
1982-83	5	0	2	7
1985-86	5	5	2	12
1987-88	7	5	4	16
1990-91	10	5	6	21
1991-92	10	5	6	21
1992-93	0	5	6	11
1993-94	0	5	6	11

Source: Table 2.11: Import and Iqra Surcharges and Import License Fees (percent of c & f values), Kemal et al., 1994

Similarly, various ad hoc arrangements adopted haphazardly over time resulted in a tariff structure that no longer cascaded (i.e. higher rates of duties were not applied with increasing levels of processing) (NTRC, 1986). For instance, machinery (mechanical) had an effective rate of 28 percent; iron and steel which were the raw material for it, had an accompanied tariff rate of 57 percent (NTRC, 1986).

[18] Para-tariffs fall within the category of import surcharges and taxes including internal charges and taxes. These are considered as additional charges and taxes not directly related to the services rendered in import-export transactions (Hoekman et al., 2000).

[19] Smuggling emerged as a serious problem in Pakistan in the early 1980s as most prohibited or non-prohibited items were freely available in the country. This led to a thriving market business called *BARA* market which is an informal name in Pakistan for markets dealing with smuggled goods. By middle of 1980s, there were at least 11 *BARA* type markets in Karachi, 12 in Balochistan, 16 in Punjab and 14 in NWFP and the adjacent areas (NTRC, 1986).

[20] IQRA surcharge is an import surcharge. It was first introduced under the Finance Act of 1986. Levy from this surcharge is earmarked for education expenditure (Ahmad and Stern, 1991).

Thus, NTRC (1986) considered it an opportune time to "*redefine*" the tax policy objectives in the area of trade taxes and underlined a comprehensive reform strategy [21] mainly focused on the rationalization of the existing structure. Some of the salient recommendations of the Commission are given below:

- Removal of *all* exemptions (except charitable exemptions).
- Reduction in the rates of duty.
- A shift should be made from specific to Ad Valorem duty rates particularly for those items that are *not* prone to smuggling and under-reporting.
- Tariff structure must be cascaded.
- All imports and importers must be treated similarly.
- Duty slabs over time must be reduced to 5 applicable slabs (10, 20, 40, 80 and 100 percent) with basic rate *not* exceeding; 20 percent for duty on plant, machinery, basic raw materials for capital and consumer goods; 40 percent for consumer goods; 100 percent for luxury consumer goods; and 40-80 percent for consumer durable items.
- Custom duty surcharge must be abolished and maybe merged into the proposed tariff structure.

However, while trying to achieve these objectives, the process of tariff rationalization was somewhat constrained by concerns over limiting the revenue impact of tariff changes (ADB, 1999). This was due to the fact that tariff reforms after 1990 were simultaneously undertaken with ongoing reforms to broaden domestic taxation (GST) and income taxes. As a result pace of trade tax reforms largely depended on how quickly these other

[21] A large part of *first* phase of reform was of administrative nature as it dealt with custom valuation concepts, procedures and their application to Pakistan. Since administrative reforms are *not* the focus of this study, these are not discussed here.

resources could be mobilized (however, by looking at Figure 2.2 we can see that income tax mobilization did not happen until middle of 1990s while GST/VAT mobilization happened even later than that). As a result during early years of 1990 tariff reforms process were mostly put on a hold.

However, some tariff rationalization steps were taken. These included: (a) the *negative list* was drastically reduced to 75 items, as 724 items were removed from the *negative list* from 1983-84 to 1993-94 (Kemal and Siddiqui, 2002); (b) removal of most QR by 1993 (Kemal and Siddiqui, 2002); (c) import licensing scheme was gradually eliminated by 1993 (World Trade Organization, 1995); and (d) by 1992-93 the maximum rate of protection was brought down to 80 percent. But on the other side, revenue considerations sometimes reversed this process. For instance, during the time when tariff rationalization was being undertaken, Paratariffs reached a historic high of 21 percent in order to mitigate loss of revenues (see for instance Table 2.9).

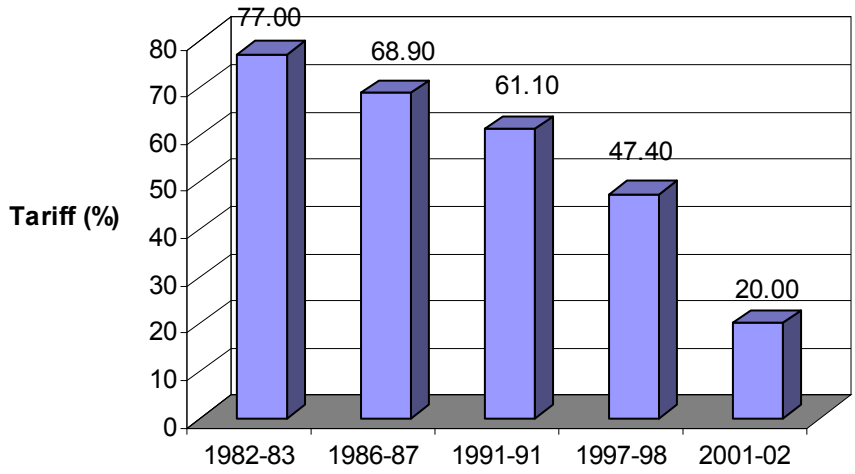
Thus, tariff reforms during this period made very *limited* or *no* headway on some critical areas flagged in the NTRC (1986) reform strategy; these included exemptions, cascading of tariff structure, smuggling etc. For instance, the share of exempted import items within total imports between 1986 to1991 rose from 45 to 48 percent. Only one SRO relating to public transport (the yellow cab scheme) is estimated to cost the exchequer almost PRs. 12 billion (Pasha and Iqbal, 1994). Additionally, smuggling still remained a massive problem due to high tariff and paratariff structure, according to one estimate it was around PRs. 100 billion in 1992-93 (PIDE, 1993).

b. Second phase of reforms

The *second* phase of trade and tariff reforms can be marked with the establishment of Tariff Reform Commission in 1996, which was primarily established to take forward the reforms agenda highlighted by the NTRC (1986) while keeping it in line with the overall tax reform strategy of RMTRC. The pace of this reform process was much faster than before due to revenue mobilization from the side of direct taxes and GST/VAT.

The tariff reform process followed during this time was "top down" where top normal rates are reduced by pushing more and more tariff lines into lower rate categories (World Bank, 2004). This resulted in un-weighted average custom duty rates coming further down from around 42 percent in 1996-97 to around 20 percent in 2001-02 (see Figure 2.3).

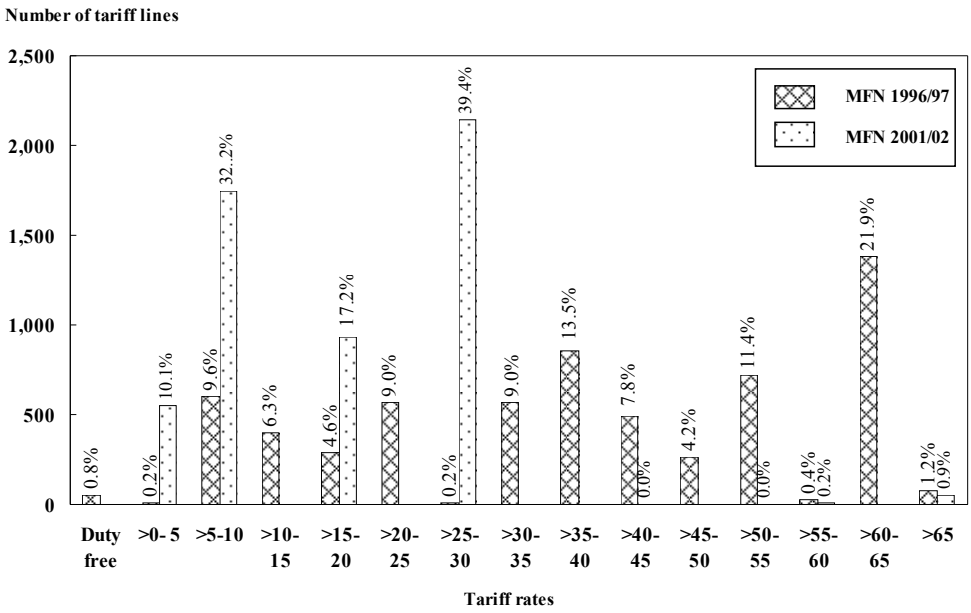
Figure 2.3: Tariff Trend (1980-2001)



Additionally, during the same time the number of tariff slabs was drastically reduced. Between 1996 and 1998, tariff slabs were reduced from 14 to 6 and eventually by 2001-02 to only 4 (World Bank, 2004). Furthermore, along with the reduction in the top rates and duty slabs, good progress was made in the

reduction of duty rate dispersion (World Trade Organization, 2005); see for instance Figure 2.4. Furthermore, 99 percent of remaining tariffs are now ad-valorem, which are more transparent than other tariffs (World Trade Organization, 2005).

Figure 2.4: Distribution of MFN Tariff rate, 1996-97 – 2001-2



Source: Chart III.1, Distribution of Tariff rates, 1996/97 and 2001/02, PP. 31, Trade Policy Review, Pakistan, World Trade

Similarly, Paratariffs were integrated into the statutory tariff schedule without increasing the maximum rate in the later part of the 1990s (International Monetary Fund, 2001). According to ADB (1999), the *negative* list by 2001-02 was also reduced to 68 items[22] (from 214 items in 1989) and the remaining import restrictions are mainly based on health, security, environment, and

[22] But few items on this list are still maintained to offer protection to local producers. These include restriction on textiles (including cotton fabrics, carpets, knitwear, bed linen and other textile floor covering) (Asian Development Bank, 1999).

religious reasons[23]. A significant headway has been made in the reduction of duty free imports. For instance, from 2001/02 no tariff lines are duty free and the lowest tariff rate has been raised to 5 percent (World Trade Organization, 2005). This is a clear break from the past as prior to this change, in 1996-97, 4 percent of the tariff lines were duty free and five times more in 1996-97 (World Trade Organization, 2005).

Thus, at the end we can say that the commission envisaged the declining importance of trade taxes within the indirect taxes because these taxes were deemed smuggling prone, leading to misallocation of resources and causing substantial revenue losses. As a result, substantial reform process that has taken place is primarily aimed reducing the role of trade taxes within the overall tax revenue of Pakistan.

2.3.2.2 Sales Tax

Sales tax in Pakistan was introduced in pre-partition time. In the Punjab province, it was introduced in 1941 while in the province of Sindh in 1947. Initially, it was a provincial tax in accordance with the provisions of the Government of India Act, 1935. However, in 1951 sales tax on goods was permanently shifted to the federal list. The Sales Tax Act of 1951 which replaced the Sales Tax Act of 1948, introduced a single stage manufacturer tax imposed on imports and on domestic production with a standard rate of 12.5 percent (CBR Yearbook, various years).

[23] According to Asian Development Bank (1999) there are still at least 28 non-trade barriers aimed at protecting local producers.

During the years before the reform, the sales tax was a minor tax. For instance, in 1986-87 sales tax was responsible for less than 10 percent of total federal taxes or less than one percent of GDP. The reason for this lacklustre performance was that the sales tax regime was riddled with numerous exemptions which resulted in a very narrow tax base. For example, according to Ahmad and Stern (1991), the number of sales tax exemptions in the mid-80s was fairly large as it included around 300 tariff headings and 19 broad categories of domestically produced goods. Additionally, the sales tax regime was operated much like a surcharge on excise duties or a trade tax with a large proportion of sales tax collection coming from the import side. According to the International Monetary Fund (2001) this tax was highly distortionary, difficult to administer, and unsuccessful in raising much revenue.

The motivation for Sales Tax reform, according to Commission's (1994) report came from:

(a) Need to maintain revenue neutrality as a result of trade and tariff reforms (as mentioned in the earlier section).
(b) Distributional concerns
(c) VAT superiority over Sales tax
(d) Export promotion
(e) Documentation of the economy[24]

As according to the Commission (1994) report:

- "…furthermore, contrary to popular perceptions, a move away from Custom Duties and Excise duties towards a General Sales Tax (GST)

[24] Here it means creating more incentive to either keep activities in the formal sector or increasing benefit of bringing activities within the formal sector of the economy.

or a VAT can contribute to making the tax system less regressive", (pp. 31).

- "It has been shown that a VAT imposed at low rates and with exemptions accorded to the goods consumed by the poor – and when combined with excise duties on luxury goods—will make the tax system mildly progressive", (pp. 47).

- "Tax system in Pakistan is by and large inequitable and violates the dictates of horizontal and vertical equity…….furthermore, import taxes and excise duties (which are mostly regressive) occupy the centre stage in indirect taxation as opposed to sales tax (which are essentially neutral with respect of incidence)", (pp. 37).

- "…in this connection, one of the maxims of optimal taxation may be kept in view – given the acceptable level of efficiency cost, taxes imposed on income-inelastic items of expenditure produce more revenue than those levied on income-elastic items, of course on the understanding that the income-inelastic commodities consumed by the poor will be exempted from tax. As for the rate structure, the reformed tax system will, by definition, carry much lower and undifferentiated rates than is the case now", (pp. 42).

However, some confusion can be seen from commission reports regarding the distributional impact of GST. For instance:

- "Introducing a consumption based VAT, its adverse effects on equity should be offset by corrective reforms in direct and indirect taxes", (pp. 41).

- "VAT of whatever kind is primarily a revenue-raising device, and is administratively effective only when its rate structure is by and large simple and differentiated. The equity objective will, therefore, be mainly achieved by raising a share of genuine direct tax", (pp. 48).

A major change in the sales tax regime came in 1990-91, with the passage of Sales Tax Act of 1990 by the Parliament. This led to the imposition of a variant of Value Added Tax (VAT) known as the General Sales Tax (GST)[25]. GST was initially levied at the import and manufacturing stages. The Sales Tax Act of 1990 imposed a sales tax at the rate of 12.5 percent on imported goods and on the value added at each stage of production, from production through retail level and on goods manufactured or sold in Pakistan. Although the federal government could only charge sales tax on goods[26], this regime was extended to incorporate several services. And in some case revenue from services subject to central excise duty is collected as it were sales tax[27] (State Bank of Pakistan, 2005).

The GST regime at the start, like its predecessors (trade and tariff regime) was riddled with exemptions[28]. Thus, even when between 1991-93 GST was levied

[25] This included replacement of the traditional administrative structures by separate functions of audit, assessment, enforcement, arbitration and monitoring. In addition to this, domestic sales tax collection was transferred from central excise collectorates to the newly established collectorates for sales tax (Refaqat, 2003).

[26] The Federal Legislative list (item no. 49 of the Fourth Schedule) of the constitution provides for levy of tax on sales and purchase of goods, but *not* on services. The Sales tax act, 1990 accordingly is applicable only to supply of goods. Services are, therefore, considered to be a provincial subject. In the case of eleven services (hotels; caterers; clubs, agents; radio and televisions advertisement; custom agents; ship chandlers; stevedores; courier services; beauty parlours; laundries, and dry cleaners; Provincial ordinance have been promulgated authorizing the Federal Government to collect tax on services as if under the Sales tax Act, 1990 (State Bank of Pakistan, 2005).

[27] These include telephone/telegraph/telex/fax; advertisement on TV; travel by air/train; shipping agents.

[28] The GST revenues in the early years of reform also did not increase because of a system of geographical (i.e. granted on the basis of promotion of selective industries) and developmental exemptions (i.e. granted to the backward areas of the country). Geographical exemptions included areas such as Special Industrialized Zones (SIZ) encompassing areas such as Gadoon

on 59 additional industries the revenue impact of this inclusion and also of shifting to the GST regime (for the first three years) was almost negligible (Pasha, 1995). The main reason for this was that, at the same time, the government exempted 120 additional locally produced goods, including agriculture products, raw products, semi-manufactured goods, petroleum, electricity, pharmaceuticals, fertilizers, motor vehicles, toys, etc. (International Monetary Fund, 2001). A significant step in the right direction was made in the budget of 1994-95 when the government eliminated 266 exemptions. Further broadening occurred when in August 1999 GST was extended to lucrative sectors such as petroleum products, natural gas, and electricity (International Monetary Fund, 2001).

It must be added that the initial years GST expansion into the retail sector met with fierce resistance (International Monetary Fund, 2001). According to International Monetary Fund (2001) during the initial years GST was deliberately kept restricted to the manufacturing and import stage for administrative and collection ease. Although its extension to the retail sector was being contemplated by the middle of the 1990s in order to bring the GST in line with the true essence of VAT, the government opted to introduce small changes at a time[29]. In 1996-97, the government announced that the retail sector will be brought into the GST net but this announcement was met by fierce tax payer resistance. As a result, the government imposed a turnover tax

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and Amazai, and a large part of (province) NWFP and (province) Balochistan. Most of these geographical exemptions persisted until the middle of 1990's but automatically expired by the end of the decade of 1990s. But exemptions granted to backward areas such as Provincial and Federal Administered Tribal Areas as well as Northern Areas still exist. Thus, the impact of gradual elimination of standard, geographical and developmental exemptions along with broad basing has been felt within the GST regime over time as GST revenues in the later part of the 1990s increased sharply. For example, sales tax as a percent of total federal taxes was around 15 percent in (1990-91). This steadily increased to 19 percent by (1995-96). The real jump came in (1998-99) when sales tax revenue as a percent of total federal taxes increased to 23 percent.

[29] For instance, GST broadening in (1994-95) was not without its consequences as inclusion of 266 additional items within GST net met with strikes by the business community. This forced the government to temporarily suspend GST collection from additional items (Ahmed, 1997)

of three percent on the retail sector instead. Unyielding tax payer resistance and implementation problems forced the government to replace this turnover tax in April 1998, with a system of fixed fees, called *enrolment certificates*, which were to be monitored by the retail association themselves. However, this move was not effective from a revenue point of view: the government abandoned this scheme and again took up the issue of extending GST on the retail sector. The second time around (July 1998), the government legally imposed GST on the retail sector, but as a result of massive and expected nationwide strikes, postponed enforcement till May 2000. In May 2000 retailers were granted an option to pay a two percent turnover tax in lieu of GST up to (end) June 2001 and this time the government stood its ground.

There is no question that Pakistan has carried successful General Sales Tax reform in the past decade or so as at the end of reform process in 2001-02 revenues from GST as a percentage of federal taxes stood at 41 percent compared to 15 percent at the start of the reform process. Thus, as far as the issue of maintaining revenue neutrality (due to trade taxes reform) is concerned, the sales tax reform filled this gap.

But perhaps a more relevant question here is whether these reforms were implemented in keeping with the RMTRC reform agenda or resulted in something quite different. There is no question that something close to the spirit of VAT was envisaged by RMTRC; a tax that was broad based but fair and where fairness issues was explicitly dealt by exempting those goods that are predominantly consumed by the poor and by maintaining a low tax rate. These questions can not be answered alone by reviewing the policy documents or the overall revenue patterns. Thus, one chapter of this study will try to answer all these questions related to GST: (a) Distributional affect of GST in post and pre-reform time; (b) What is being consumed by the poor in Pakistan;

and (c) How well placed are GST exemptions? And are these really benefiting the poor?

2.3.2.3 Excise Duties

Excise duties have historically been the second largest source of revenue for Pakistan after custom duties. In 1985-86, excise revenue was equivalent to 2.5 percent of GDP and before the start of the reform process excises were yielding around 2.2 percent of GDP (see for example Figure 2.2). Excises have always been levied on only a limited number of goods and as a result revenue pattern has been highly skewed (Iqbal and Pasha, 1994).

According to the RMTRC (1994) report, excise tax reforms attempted to broaden the base[30] and in some cases increase the tax rates[31] [32]. The reform agenda has attempted to introduce capacity taxation in key industries. This was done *via* formulation of a special Capacity Taxation Committee (CTC). The move to capacity taxation was expected to stimulate production activities in industries[33] and to reduce corruption and harassment of tax payers at the hands of tax officials (RMTRC, 1994). However, CTC committee found it extremely hard to arrive at a consistent formula for fixing the tax base for individual units in various industries (Iqbal and Pasha, 1994). As a result, this measure was only carried out in the cement industry due to relative

[30] Excise duties broad-basing over the years has led to targeting of service utilities (telephone), bank advances, unprocessed fiber, sugar and petroleum (RMTRC, 1994; International Monetary Fund, 2004).
[31] In 1991-92, specific rate was increased on bank cheques while ad valorem rates were raised on hotels and television adds (RMTRC, 1994).
[32] Excise duty rate of 25 percent was levied on telephone bills for this first time in the Finance Act of 1991. In 1992, this rate was increased to 60 percent which led to massive loss of revenue from this head due to leakage as a result of such high rates. Thus, in 1993 rates were again brought down to 35 percent.
[33] As the marginal tax rate in this system with respect to output is zero.

homogeneity of output and later it was even withdrawn from this industry (Iqbal and Pasha, 1994).

As far as taxation of goods under excises is concerned, over the years a conscious policy attempt has been made to limit excises to few revenue heads as is the case in most developed countries. The main aim has been to ease administration and monitoring burden by focusing on key industries. As a result, the excise duty focus with regards to taxation of goods over time has been narrowed. For instance, five goods constituted 73 percent of total excises in 1990-91 but this increased to 82 percent in 2001-02[34].

One specific interesting development over time has been the extension of excises to service sector, and particularly to those services where GST/VAT extension has not been possible. Along with broad-basing to levy excise duty to some services (see Box 2.1), excise duty rates have also gone through frequent change over the years, usually announced in Government annual budget.

Box 3.1 : Levy of Excise duty on Services

i. *Services subject to Central Excise duty*:

This includes advertising, insurance, shipping and travelling agents.

ii. *Services subject to Central Excise duty which is collected as if it were sales tax*

This includes domestic travel by air, by train (AC parlour or first class sleeper only), carriage of goods by air, telephone/telegraph/telex and fax services etc.

[34] These five goods in 1990-91 and 2001-02 included cigarettes, beverages, POL products, cement and sugar (but sugar in 2001-02 was replaced by natural gas) (CBR Yearbooks, various years).

It would not be wrong to say that the role of central excise duty (CED) under the current taxation structure of Pakistan is envisaged to be one that aids sales tax extension to service sector (which is not directly possible without constitutional amendment). A conscious policy effort over time has been made to restrict excise duties to few selected items in order to ease administrative burden. These policies have led to a sharp decline in the collection of excise duties over time from around 2.2 percent of GDP prior to reform process to only 1.7 percent of GDP at the end of reform process.

2.4 Conclusion

The main aim of this chapter has been to provide a summary of what has happened to the federal taxation structure of Pakistan due to the tax reform of the 1990s and also to point out various factors that initiated and helped the reform process stay its course along with providing an overview of reform agenda particularly with regards to equity and distributional concerns.

Although, Pakistan's tax system has undergone profound changes during the decade of the nineties, despite these changes tax revenue in relation to GDP has remained fairly stagnant. For instance, federal tax revenue as percentage of GDP in 1990-91 (i.e. also the start of *first generation of tax reform* process) was 12.6 percent and by the end of the reform process in 2001-02, the ratio remained almost unchanged.

The type of tax reform followed in Pakistan largely followed from trade liberalization and focused on replacing dependence on trade tax revenues with domestic taxation such as GST/VAT. It would not be wrong to say that the government was able to successfully reduce and replace revenues from trade

taxes with GST/VAT revenues, but this led to several problems. First, the pace of these reforms led to inherent sequencing problem, as trade and tariff reforms were carried out at a faster pace compared to GST reforms. The resultant gap was haphazardly filled by (a) increasing reliance on the WHT regime of direct taxes[35] and (b) by a uniform expansion of GST on all goods without undertaking any careful analysis of extension in some cases (such as sugar, edible oils, kerosene oil etc.) met with the Commission's intention of introducing an equitable and *just* reform process. Thus, perhaps Pakistan's tax reform experience highlights the fact that issues related to equity did occupy a central place in the stated reform strategy but this concern could not be translated into specific actions/measures when policy was actually being implemented. Furthermore, it is also highlighted that as far as direct taxes were concerned, it appeared that government agenda largely focused on issues that addressed short-term revenue needs while more fundamental, structural and perhaps painful reforms were largely put off.

Although discussion in this chapter has tried to highlight (where possible) where tax reform steps or the resultant changes may not be in line with the equity and fairness vision of the tax reform Commission, most of these questions cannot be answered only by reviewing the official documents or the overall revenue patterns. Although discussion in this chapter has helped set out the overall picture, yet a detailed and careful empirical analysis is required to answer these questions, which this study intends to do. Moreover, since a similar *type* of reform process was also followed in many other developing countries, this study should be considered as a case study of the *type* of reforms carried out in several developing countries.

[35] According to the Independent Evaluation Office (2002) "while the reduction of tariffs and other taxes on international trade was relatively fast, it took much longer for the GST instituted in 1990 to yield a comparable revenue" (pp.125).

The next chapter will provide an overview of approaches and models that have been used to carry out tax incidence analysis particularly in the context of developing countries. And it will also try to establish the best possible approach that can be used given the question in hand and data availability for Pakistan.

CHAPTER III: Literature Review

3 Introduction

One of the essential goals of government policy is to address inequalities in the distribution of income and to make an attempt to improve the welfare of the poor. Thus, an important part of theory and practice of public finance is dedicated to better understanding and measuring of how revenue and expenditure side of Government policy affects the distribution of income and welfare of households (Martinez-Vazquez, 2007). This is the area of tax incidence, which deals with impact of taxes on the distribution of welfare within a society, of critical importance within the field of public economics.

It has to be accepted from the start that the analysis of tax incidence is far from simple. The diversity and the richness of the problem comes from the fact that although tax incidence appears to be a deceptively simple question, as soon as we realize that the person who is legally obligated to pay the taxes may not be the one who ultimately ends up bearing the burden of the tax complexity arises. Because this means in order to ascertain the correct tax incidence we need to know how private markets respond to taxes but this knowledge requires a vast amount of information on consumers preferences, technology, etc. which is not available (Martinez-Vazquez, 2007).

As a result, every tax incidence study varies in complexity depending on what is being asked and the set of assumptions used to drive out the key element of that study (Martinez-Vazquez, 2007). Even where there is similarity between studies in terms of country being assessed the answers tend to vary a great deal because of the time at which such analysis was undertaken, data used, tax

instruments covered etc. Hence, it can be admitted that generally no two tax incidence studies are *the* same and this makes the job of inferring a conclusive theme from such studies in this chapter quite difficult.

The purpose of this chapter is to provide a brief overview of methodological view of approaches/measures/other issues related to tax incidence analysis at household level in developing countries. The first section will discuss the partial equilibrium tax incidence approach, its limitations and how some of the fundamental concerns with this approach have been addressed by researchers. The second section of this chapter will try to summarize the evidence from tax incidence studies. The third and fourth sections of this chapter will attempt to highlight how tax incidence analysis has tried to inform policy concerned with normative issue of how social welfare should be maximised. The last section concludes.

3.1 SECTION I: Partial Equilibrium Tax Incidence Analysis

The purpose of this section is to highlight that the choice of the tax incidence approach used for analysis fundamentally depends on the question being asked. If the question is distributional analysis, partial equilibrium tax incidence analysis is adequate. However, this does not mean such is free from limitations. Thus, the aim of this section is to show relative difficulty of estimating partial equilibrium tax incidence analysis and to show how these difficulties have been mitigated (in the light of literature survey) by researchers in order to get around some of the fundamental problem of difficulties attached to this approach.

3.1.1 Tax Incidence approach but which one?

The broad methodology used in the tax incidence analysis can generally be divided into three basic approaches; first, partial-equilibrium or micro-data based incidence analysis (such as Pechman and Okner, 1974; Musgrave, Case and Leonard, 1974), static computable general equilibrium (CGE) models[36] (such as Harberger, 1962; Shoven and Whalley, 1984) and quite recently dynamic computable general equilibrium models following either the overlapping generation life cycle approach or the neoclassical growth model (such as Kotlikoff and Summers, 1987; Kotlikoff, 2001).

[36] For examples of tax incidence studies using CGE modelling for developing countries see for instance, Deverajan and Hossein, (1998) and Hossein, (1995) for Bangladesh; Shah and Whalley, (1991) for Pakistan; Dahl and Mitra, (1991) for Bangladesh, China and India; Coady and Harris, (2004) for Mexico; to name but a few.

It should not be surprising to know that most frequently used approach for tax incidence analysis for developing countries is partial equilibrium incidence analysis. This approach examines the incidence of tax within the context of a single market and assumes tax imposed in one market does not affect other markets in terms of either price changes, factor shares or income (Alleyne, 2007). Since tax shifting within one market depends on elasticities of demand and supply, this issue in partial equilibrium tax incidence models is addressed by assuming constant returns to scale; as a result, production in these models is pushed into the background. Thus, these models assume producer prices are fixed; which in this context means that increase in taxes correspond to an equal increase in consumer prices which is a fairly standard assumption also adopted in the literature of optimal taxation (see for instance Atkinson and Stiglitz, 1980; or Myles, 1995).

As a consequence, tax incidence in partial equilibrium models depend entirely on assumption of how consumers will react to the imposition of a tax; something which in the context of a perfectly competitive market is dealt by assuming different tax shifting assumptions for various types of tax.

There is no hard and fast rule to say whether partial equilibrium or a general equilibrium tax incidence approach would be preferable. The superiority of one approach over the other crucially depends on what is being asked.

Partial equilibrium modelling of tax incidence is preferable because of its tractability and intuition. These models also provide a unique opportunity to disaggregate the incidence picture since they are based on rich micro-data and this ability to disaggregate is a strength as it can provide very useful analysis as far as welfare and equity impact of a particular tax policy or a particular feature is concerned. However, such an approach is not free from criticism. The most noteworthy criticism of micro-simulation tax incidence approach has

come from Shah and Whalley (1991) who have fundamentally criticised this approach for not making any sort of attempt to incorporate tax and non-tax institutional features of developing countries[37] [38].

On the other hand, even though institutional features can be better accommodated in a general equilibrium type of modelling of tax incidence (Fullerton and Metcalf, 2002) these models are also not without serious limitations. Whalley (1984) pointed out that the results from computable general equilibrium models (particularly within the area of public finance) to a large extent appear to be driven by the value of elasticities and other parameters used in the model. Thus, it is quite possible in many cases the arbitrariness of shifting assumptions used in the partial equilibrium tax incidence models is being replaced by the arbitrariness of both the model form and its parameter values (Shah and Whalley, 1991). And it is also quite possible that in cases where second round effects are not that significant, the findings of both type of approaches are quite close (Devarajan et al, 1980).

Thus, there is no ideal or unique approach to tax incidence analysis ((Martinez-Vazquez, 2007). All approaches have their advantages and disadvantages (Fullerton and Rogers, 1991; Devarjan et. al., 1980). However, if the aim of the study is to measure the distributional affect of taxes, partial equilibrium approach is sufficient (Fullerton and Metcalf, 2002; Alleyene, 2007) As a result, partial equilibrium tax incidence approach, despite its

[37] According to Shah and Whalley (1991), the incidence of import duties may be progressive compared to regressive incidence commonly reported by conventional studies if it is assumed that incidence is borne by the recipient of higher incomes who are also the main beneficiaries of quotas and licences (see for instance Table 11-10, pp.183).

[38] Shah and Whalley (1991) mentioned that the presence of widespread tax evasion in many developing countries can make the assumption of full-forward shifting of direct taxes among some workers quite susceptible and the presence of large the informal sectors creates opportunities for some workers to reduce the tax burden by either fully or partially shifting to this sector.

shortcomings, has been quite resilient (Alleyne, 2007). This is the approach that will be followed in this study.

3.1.2 Conventional Models of Partial Equilibrium Tax Incidence

3.1.2.1 Representative or typical household approach

This is perhaps one of the oldest approaches used for tax incidence analysis[39]. This approach relies on tax burden computation relying on a relatively small number of artificial households, and their composition, expenditure and income sources are assumed to be representative of the entire population. It would not be wrong to call this approach more or less a version of the statutory or legal incidence than economic incidence. As a result, this type of analysis has been completely abandoned[40] in favour of approaches that do not ignore individual variations (Bird and De Wulf, 1973, pp. 647).

3.1.2.2 Differential incidence approach

One possible way to determine tax incidence is by comparing the distribution of income resulting from the presence of tax with some initial benchmark or counterfactual (Martinez-Vazquez, 2007). In this approach the result of income distribution due to taxes is compared with some initial benchmark

[39] This approach follows from report of the Committee on National Debt and Taxation, minutes of evidence, Vol. 1, 1927 (quoted in Prest (1955), p. 244) and Shoup (1939) for developed countries.
[40] Early examples include Adler and Wallich (1951) for El Salvador, Adler et al. (1952) for Guatemala, Shoup et al (1959) for Venezuela, and Wasylenko (1986) for Jamaica.

distribution of income such as comparison with distribution of tax burden that would have taken place if the same amount of taxes were collected from a proportional income tax (thus assuming that proportional income tax is the most neutral way to collect revenue). However, this approach has not been very popular in developing countries[41] perhaps because of small role of income taxes in the economy and because determining a true counterfactual is a tall task (Martinez-Vazquez, 2007)[42].

3.1.2.3 Numerical Tax Incidence Approach

The most frequently used approach for tax incidence analysis is the numerical tax incidence approach. This approach is directly adopted from the seminal work of Pechman and Okner (1974)[43]. The objective is to allocate tax burden by income groups. The term *numerical tax incidence* refers to the procedure of imputing tax incidence where the total amount of tax revenue collected by the Government is allocated to the households grouped by income classes. As a

[41] For application, see Sahota (1968) for Brazil, and Sjoquist and Green (1992).
[42] Determining a true counterfactual will require observing an economy without taxes, which is not possible (Martinez-Vazquez, 2007).
[43] The origin of large majority of work on tax incidence analysis for developing countries is Pechman and Okner, (1974). This study was based on 87,000 income tax return and 30,000 households from 1966 U.S survey of economic opportunity file. The novelty of the analysis was that the incidence analysis was carried out using eight different set of shifting assumptions. P&O, for all classes assumed that the burden of personal tax is borne by the households and the burden of sales and excise taxes falls on households according to their consumption patterns. The employee part of payroll tax remains with the worker. The property tax is analysed for cases when it affects either the return to landowners or all capital owners while for corporate taxes they assume four different scenarios; where it is shifted to shareholders, capital owners, wage earners or consumers. Total tax incidence is calculated using effective tax rate (i.e. total tax burden as a proportion of economic income) for each household. Interestingly they found US tax system to be "proportional" irrespective to whether they use the most-progressive set of assumptions or the least-progressive set of assumptions. This analysis has also come to be known as the "proportionality hypothesis" and the main conclusion that emerged from this analysis was that the U.S. tax system does not redistribute income and this conclusion sparked intensive policy debate within U.S. tax policy for many decades to come.

result this approach assumes no excess burden or deadweight loss[44]. Thus, at the end the total burden allocated for each tax is equal to the total revenue collected[45].

Over the years although the gist of analysis is still based on micro-data, there have been many additions and changes to this methodology to better fit such approaches to the data availability, tax instruments and the country context, although it must be admitted that not much has changed in terms of tax shifting assumptions[46]. For instance, in many cases the recent studies using this methodology have dropped the proportionality assumption between tax burden and tax revenues; thus calculating tax liabilities only in cases where actual consumption of the taxed item takes place within the households[47]. This is a much better approach as it allows for both excess burden as well as tax evasion. In some cases the tax incidence analysis has focused on calculating *effective taxes* that involves the use of input-output tables for the economy. The general idea is to trace taxes on intermediate goods through input output table to estimate the implied tax on the final product (Rajemison and Younger, 1999)[48]. This allows one to take account of cascading effect of taxes which can be important for taxes that fall heavily on the intermediate goods[49].

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[44]However, this is an acceptable approach as long as we differentiate between the equity impact (tax incidence) and efficiency impact (excess burden) (Martinez-Vazquez, 2007).

[45] For application, see Ghandi (1966) for India, Bird (1970); and Mclure (1971) for Columbia, Yukon (1976) for Tanzania, Foxley (1979) for Chile, Lovejoy (1963); Bird and Miller (1989) for Jamaica, Azfar (1974); Jeetun (1978); Kazi (1984); Malik and Saqib (1985); Khalilzadeh-Shirazi et al. (2001) for Pakistan, Chen et al. (2001) for Uganda and Sonia et al. (2003) for Ethiopia.

[46] Issues related to tax shifting assumption are discussed separately.

[47] For application see, Engle, Galetovic and Raddatz (1998) for Chile, Refaqat (2003); SPDC (2004) for Pakistan, and Martinez-Vanquez (2001) for Mexico, to name a few.

[48] According to Ahmed and Stern (1991), difference between nominal and effective tax rates may be quite significant. For instance, for India and Pakistan they found that even when nominal tax rates on goods primarily consumed by the poor were zero or negative (i.e. a subsidy), many of such goods had positive effective rates.

[49] For application see, Heller (1981) for Korea, Ahmad and Stern (1991) for India and Pakistan, SPDC (2004) for Pakistan, Engle, Galetovic and Raddatz (1997) for Chile, Rajemison and Younger (2001) for Madagascar, and Cho et al. (2003) for Ethiopia.

However, this approach is not free from problems even if input-output tables are available and readily updated. Estimation of effective tax rates requires considerable aggregation across goods as a result reducing the accuracy of progressivity comparison (Gemmell and Morrissey, 2003). For instance, in the case of Madagascar, use of input-output table reduced the number of goods examined from 222 to 30 (Rajemison and Younger, 2001), which is a serious loss of information.

3.1.3 Tax incidence analysis: other issues

3.1.3.1 Annual or lifetime[50] Perspective on Incidence?

The question of looking at the incidence from lifetime versus annual perspective is an interesting one. Theoretically, one would expect annual and lifetime tax incidence calculation to vary for several reasons[51]. For instance, it is quite possible that the annual measure of income reflects transitory components (such as sickness and unemployment) which are bound to have a smaller effect on consumption than when permanent change in income is considered. This can be credited to the permanent income hypothesis (Friedman, 1957). Second, income measured in a single period differs from lifetime income due to age related differences in earnings[52] (Lyon and Schwab, 1995). Third, consumption of certain items follows life cycle pattern which is independent of changes in income (Modigliani and Brumberg, 1954).

[50] *lifetime income* concept can be defined as present discounted value of earnings plus gifts and inheritance received.
[51] For theoretical distinction between annual and lifetime incidence approach see Levhari and Sheshinski (1972) and Driffill and Rosen (1983).
[52] Mincer argues that about half of the log variation of earning is attributable to transitory components and age related differences (pp. 119).

A very few studies have taken a more rigorous approach of trying to estimate the lifetime earning capacity of the household and not surprisingly most of these are on developed countries (Fullerton and Rogers 1991; 1993, Davies et al, 1984). Perhaps surprisingly, the main result of such a carefully done work was not much different from results reported by Pechman (1985). Perhaps more importantly, the refinement between lifetime and annual perspective may carry very little weight as far as developing countries are concerned as life expectancies in these countries tend to be relatively short and the level of poverty is stark (Bird and Zolt, 2005).

3.1.3.2 Tax shifting Assumptions

It may not be wrong to say that the role of incidence assumptions is to aid the allocation of the tax burden between different income groups (Vazquez, 2007). Most of the studies on tax incidence for developing and developed countries use the 100 percent tax shifting assumption particularly where indirect taxes incidence is concerned; although lesser consensus appears to hold where pass through effect of direct taxes is concerned (see for instance Table 3.1). This assumption simplifies the analysis since it allows the tax component of the retail price of an item to be easily identified on the basis of statutory legislation.

In a perfect competitive market under a partial equilibrium tax incidence analysis this assumption implies taxes will always be shifted from 0 to 100 percent while the exact burden lying within this range depends on the relative elasticities of demand and supply of an item. Things get slightly complicated when market structure other than perfect competition is considered (Besley, 1989; Delipalla and Keen, 1992; Katz and Rosen, 1985; and Stern, 1987).

What has been emerging from this work is that under an imperfectly competitive market structure, a variable degree of tax shifting possibilities exist and even over shifting becomes a real possibility: see for instance Lockwood, (1988) and Stern, (1987a). According to Stern (1987) "100 percent shifting is a reasonable intermediate assumption and not a polar case that the simple theory makes it appear".

There are very few studies that have tried to answer the question of tax shifting assumptions but most of those studies are limited to analysis of a few goods. Sidhu (1971) found evidence of overshifting of sales tax; the same is found by Besley and Rosen (1994; 1996)[53]. Poterba (1996) on the other hand found evidence supporting the perfect competition assumption.

There is very limited research within this empirical area for Pakistan and where some evidence does exist it is quite simplistic in its methodology and often the time period covered is quite limited. Few studies for Pakistan have focused on the effect of price shifting due to import taxes. These have compared the c.i.f. prices of import with their corresponding wholesale price, (Pal, 1964; Alamgir, 1968). This approach concluded that given profit margins are so high, small changes in import duties are unlikely to be passed on to the consumer. Radhu (1965), on the other hand, related changes in taxes (sales and excises taxes) to changes in prices and found taxes are not shifted to

[53] Sidhu (1971) analyzed relationship between CPI and sales tax rate in a sample of seven cities during (1954-66) and found evidence of over shifting for four out of five categories under consideration. Besley and Rosen (1994) examined the impact of state and local sales tax on the price of a particular item. Their study also yielded evidence of overshifting. Poterba (1996) study is an empirical analyses that examined city specific price indices for eight cities for fifty year period (1947-1977) and fourteen cities during (1925-39). He examined quarterly data on tax rates and prices and confirmed evidence of 100 percent tax shifting assumption. Besley and Rosen (1996) extended Poterba's type of analysis using panel of quarterly data to 12 commodities and 155 cities over the period of (1982-1990). They found for half commodities tax shifting occurred almost one to one but for rest of these commodities, there was clear and robust evidence of overshifting.

consumers. However, subsequent studies that extended Radhu's work report differently. Irfan (1974) and Naqvi (1975) found evidence that taxes are shifted to consumers and in some cases evidence of overshifting[54].

Given the lack of empirical research in the area of tax shifting assumptions even for developed countries let alone Pakistan and other developing countries, it may be adequate to assume a full tax shifting assumption for (indirect) taxes (Besley and Rosen, 1996) but a cautious interpretation of results is necessary (for instance see Table 3.1 to see LDC factors that may impact these assumptions more)[55]. Although incidence results can be sensitive to the shifting assumptions, nevertheless there has been wide agreement on the assumptions used (Vazquez, 2007). More importantly, in practice these assumptions have been justified because the incidence results obtained from conventional studies have come out to be quite similar to results obtained with more realistic and laborious assumptions (Vazquez, 2007). As a result, this study will also follow the assumption that indirect taxes are passed on fully to the consumers.

[54] The methodology used by Irfan (1974) and Naqvi (1975) is quite simplistic. They directly relate changes in prices with changes in taxes making no effort to control for other variables such as production cost etc. Irfan (1974) focused on only tobacco and petroleum products annual prices during (1953-72) and found evidence of tax shifting. Naqvi (1975) extended this work to 12 groups of commodities. She finds that in 50 percent cases taxes are shifted to consumers and in some of these cases there is over-shifting. She finds taxes on cigarettes and petroleum products resulted into one to one increase in prices while for food products, cotton fabrics and misc. products exhibited fifty percent shifting; and taxes on chemicals revealed a pattern of over shifting.

[55] The use of full tax shifting assumption in the case of indirect cases goes back to work by Samuel (1919). This assumption is used not only in vast majority of incidence work related to indirect taxes in developing countries but also developed countries, for instance see Musgrave (1964) and Pechman and Okner (1974).

Table 3.1: Tax shifting assumptions

Taxes	Assumptions	Agreement	LDC factors not incorporated that may impact incidence results /1
Income Tax	Paid by the recipient of taxes	YES	Tax Evasion
Corporate Tax	1. Shifted backward to the owners of capital 2. Shifted forward to the consumer 3. Fifty percent shifted backward and fifty percent shifted forward	No	-
GST/VAT	Paid by the purchaser of taxed items	YES	Informal Markets
Trade Taxes			
a. Import Duties	Paid by the purchaser of taxed items	YES	-
b. Export Duties	Borne by buyer of exporting item if seller has monopoly power in Int'l market; otherwise by seller	NO	Smuggling
Payroll Taxes	Employer contribution borne by employer; employee contribution borne by employee	YES	-

Source: Shah and Whalley (1992); Table 4: Tax incidence assumptions, Morrissey and Gemmell (2003) ;Vanquez (2007): assumptions used in conventional models of tax incidence, pp. 7-9.
Note: 1/ Column 4, Table 4: Tax incidence assumptions, Morrissey and Gemmell (2003)

3.2 SECTION II: Tax Progression and Evidence[56]

This section summarizes the evidence of tax incidence analysis in terms of tax progression. Whilst there may be different ways of considering insight from tax incidence studies, it is reasonable to focus on the results that they offer in terms of tax progression. Since there are different ways of measuring tax progressivity, the first section starts with describing how tax progressivity has been measured in tax incidence analysis for developing countries before embarking on what can be learned from incidence studies.

3.2.1 What can be learned from evidence on tax progression and distribution: some general conclusions[57]

It is hard to infer one common conclusion from the tax progression literature as far as progressivity, regressivity or neutrality of overall tax system or its components is concerned as these conclusions are often country specific (Gemmell and Morrissey, 2003). This is perhaps one reason why tax progression studies have received a lot of criticism from tax incidence surveys such as Bird and De wulf (1973) and De Wulf (1975), as results appear to vary not only across countries but also within the same country. Nevertheless, both partial equilibrium tax incidence models of tax progression and distribution

[56] For a brief discussion on measures of tax progression commonly used in tax incidence studies, please see Appendix 3.3. .

[57] This section is not a survey of tax incidence studies. For surveys see Bird and De Wulf (1973), De Wulf (1975), Mclure (1977), Jimenez (1986), Shah and Whalley (1991) and more recently, Chu ke-young et al. (2000).

reveal some interesting general conclusions/themes and some of these are summarized below.

The recent evidence on incidence of taxes on consumption reveals this to be much less regressive than suggested earlier (Chu et al., 2000; Gemmell and Morrissey, 2005). Trade liberalization motivated tax reforms, that have replaced import taxes in most developing countries with domestic taxes such as sales taxes, have appeared to make the underlying tax incidence a little more progressive (Gemmell and Morrissey, 2005). Thus, recent literature has underlined the importance of *not* to pre-judge the incidence, particularly of indirect taxes on *a priori* belief. According to Bird and Zolt (2005), the distributional impact of indirect taxes in any particular developing country depends on a question of relative quantitative importance of different taxes and underlying income distribution patterns in that society. As a result, such matters cannot be decided on *a priori* grounds.

Another important aspect that has emerged from this literature is the importance of asking the *right* questions which such methodology can accommodate. One reason why findings of most of tax progression studies are at best *mixed* is because most of these studies have only focused on the progressivity, regressivity or neutrality of *this* or *that* tax (Bird and Zolt, 2005). And this is bound to run into inherent problem of identifying a distribution of income that is considered to be acceptable to everyone in the society. Thus, focusing on the right questions will not only make this research more interesting but also meaningful from a policy perspective. For instance, recently some studies have started to focus on particular issues such as how progressivity of underlying tax system is affected by: (a) replacement of general sales tax with excises; (b) reforms that have replaced trade revenues with domestic taxes such as GST/VAT or ; (c) focusing on a particular change

in the design of indirect taxes that may be more relevant for its potential impact on the poor (Bird and Zolt, 2005).

The last point warrants more attention. Although, it is agreed that indirect taxes can play a very limited role in redistribution of income that does not mean that they do not impact the lives of the poor in a limited but powerful way (Bird and Zolt, 2005). Thus, even though the overall incidence of fiscal policy is what really matters for redistribution, the policy makers in developing countries need to pay close attention to even minor features of consumption tax design and implementation as they can have important distributive effects (Bird and Zolt, 2005).

One thing that has become evident over the years is that such features can easily remain hidden in an aggregate analysis. Thus, detailed micro-analysis of expenditure data with close attention to details of tax structure is necessary for such conclusions (Bird and Zolt, 2005). Thus, even though most partial equilibrium tax incidence literature has been based on rich micro-data, minute policy analysis of particular features has not been explored.

For instance, excise duties, like other indirect tax components have been analysed in terms of whether these are collectively progressive, regressive or proportional. This focus has ended up revealing at best a mixed bag of results. Thus, such research has been largely uninformative for policymakers who have resorted to levying excises based on conventional wisdom i.e. taxing luxuries or taxing those items that have explicit negative externalities attached to their consumption. Most studies have not focused on individual excises even though excise levies on petroleum, tobacco and alcoholic beverages for most developing countries make up almost the entire revenue from this heading. As a result, their individual redistributive effects can often be as large as any single component of tax system.

This issue i.e. determining the incidence of individual excises due to their possible effect on the poor has, however received much more attention in recent literature using distribution measures such as concentration curve and associated welfare dominance technique and some thought provoking results for policy makers have been revealed (for instance look at Table 3.2).

Table 3.2: Results of welfare dominance for African countries

	Cote d'Ivoire	Guinea	Madagascar	Tanzania	Uganda	Ghana	Ethiopia
Export	N	N	N	-	R	R	-
Imports	N	P	P	P	P	-	-
VAT/ST	N	P	P	P	P	N	P
Excises	N	N	P	P	N	-	-
Tobacco	N	N	P	N	P	R	-
Alcohol	P/N	P	-	P	P	P	-
Non – alcoholic Bev.	P	P	-	-	P	P	-
Gasoline	P	P	P	P	P	P	-
Kerosene	N	R	R	N	R	R	-
Transport	N	N	P	P	-	-	-
Autos	P/N	P/N	P	-	-	-	-

Source: Table 2: Results from dominance testing, Gemmell and Morrissey (2005), pp. 138.
Note: Format of result presentation compared to original source is different. Here, P means progressive; N means neutral/inconclusive and R means regressive. Also, this Table has been extended to include Munoz et al. 2003 for Ethiopia.

From Table 3.2 we can see that even though it is hard to say anything about the overall excises collectively, at best they appear to be neutral or inconclusive. But when this information is disaggregated some interesting results are revealed. For instance, the incidence of excise duties on car/petrol generally appears to be strongly progressive (Gemmell and Morrissey, 2005); inconclusive for tobacco, progressive for alcoholic and non-alcoholic beverages; and clearly regressive for kerosene. This presents very relevant information for the policy makers i.e. rationalization of excises on tobacco or alcohol will generally improve efficiency in these countries and would not make the poor worse off (Gemmell and Morrissey, 2005). Similarly, taxation of kerosene, which is a fuel generally consumed by the poor in these countries is clearly regressive and as a result harming the poor. Thus, it should be a serious reconsideration for the policymakers with a pro-poor agenda,

particularly when it is possible to exempt this tax to help the poor without encouraging inefficient substitution between fuel types (Gemmell and Morrissey, 2005).

However, despite the voluminous nature of research in the area of tax progression, very few tax progression studies have focused on the distributional impact of individual excises in developing countries. Issues of tobacco taxation and alcohol taxation have received very little attention. Exceptions include McLure (1977a), who found the tobacco tax in Jamaica to be far the most regressive indirect tax. This is also supported by Cnossen (1977) who found tobacco tax to be the most regressive tax in a number of countries. In some cases these excises have appeared to be progressive but progressivity was mainly due to higher tax on imported cigarettes (DeWulf, 1974 for Lebanon and Asher and Booth, 1983 for Philippines and India and Indonesia). High taxation of alcohol has been supported on social grounds in some countries. For instance Bird (1983) and Bird and Wallace (2005) note that higher taxation of alcohol in some cases may not be regressive. But research in this area is not sufficient and further research in the selective role of excises based on detailed micro data is necessary in order to formulate and guide tax policy analysis in this area in developing countries (Bird and Zolt, 2005).

Recent literature on the incidence of GST/VAT appears to indicate that VAT in some countries may be more progressive than trade taxes and excise duties and in some cases it may be as progressive as income tax (Shah and Whalley, 1991). This is despite the fact that tax incidence studies using distributional measures have generally put VAT on low progressivity ranking compared to other taxes (Gemmell and Morrissey, 2005), but generally these are not found to be regressive (see Table 3.2). Evidence on this coming from tax progression studies is mixed; for instance GST/VAT neutrality is reported for Ghana

(Younger, 1996) and Pakistan (Refaqat, 2003) and regressivity of VAT is reported for Korea (Heller, 1981) and Pakistan (SPDC, 2004).

Very few studies have explored the explicit issue of replacing GST with VAT (which is a very relevant tax reform issue as many developing countries are undergoing this transition). This issue is explored for Ethiopia (Munoz et al., 2003), and Uganda (Chen et al., 2001). Findings so far are mixed since results for Uganda shows that although the effective tax after reform is higher, perhaps due to better coverage, post- reform tax system appears to be neutral. Only results for Ethiopia indicate this reform process having an adverse impact on the bottom forty percent of the population. Few studies have also indicated that GST/VAT neutrality or slight progressivity conclusion is likely to emerge when expenditure is used as a base rather than annual income. But on the other hand, this study reveals an interesting point that disaggregated incidence picture is *not* that sensitive to change in base. Thus, a disaggregated conclusion regarding particular policy features is important (Refaqat, 2003).

Due to the emerging prominent position of GST/VAT revenues in many developing countries, many issues related to this type of taxation have received more attention. For instance, the issue of GST/VAT taxation at a uniform or differentiated rate is an important issue and has received some attention. Ahmad and Stern (1983) noted for India that a shift to a uniform taxation would reduce the expenditures of the poorest segment of rural and urban households by almost 7 and 5 percent due to increase in the prices of many essential items. Similarly, Bird and Miller (1986) using basic micro data for Jamaica show that if the current highly differentiated tax system is replaced by a uniform General Consumption tax (GCT), it would increase taxes on all income groups and also increase the regressivity of the indirect tax system.

Interestingly, recent research has also pointed out several reasons why conventional incidence studies may be overestimating the burden of GST/VAT. For instance, Fedeli (1998) pointed out that VAT may make the tax system less allocatively distorted as it reduces the pressure on market-based activities to move into the informal sector. Gemmell and Morrissey (2005) have pointed out that VAT may be beneficial for the poor as it improves upon serious price distortions as a result of *ad hoc* array of excises. However, more research is required to quantify these issues but they do put an interesting contrast to the traditional "regressive" label pre-assigned to these taxes.

Some studies on GST/VAT incidence have gone beyond the question of progression, regression or neutrality. For instance, some research has focused on the possibility of differential taxation[58] under GST/VAT due to very substantial differences in consumption patterns between income groups in developing countries (Bird and Zolt, 2005). Although this issue has not received much attention in most conventional progression and distributional studies in developing countries, this is a very important issue particularly in the context of the poor. For instance, in most developing countries it is a common practice to exempt unprocessed food items from the GST/VAT net. This practice is based on the age old *a-priori* belief that only un-processed food items consumption is important for the poor. But recent research has challenged this policy stance particularly in some developing countries where GST/VAT has been extended to unprocessed food items. For instance, disaggregated results for Pakistan, India and Jamaica have revealed GST/VAT taxation of sugar has very important implication for the poor (Ahmad, Leung, and Stern, 1984 for India and Pakistan; Bird and Miller, 1986 for Jamaica). In fact results from the Bird and Miller (1986) study show that that exemption of

[58] Differential taxation in the case of GST/VAT may not necessarily mean thinking about different standard rates for GST/VAT but may also mean thinking about commodities that should face standard VAT rate and those that should be exempted.

few processed food items can eliminate almost all of the regressivity of GCT. They also found that GST on sugar appeared to be the most regressive tax within all taxes.

Thus, it is no surprise to find that these issues have recently received more attention in the context of GST/VAT exemptions and in some recent studies this issue has been explicitly addressed using the "distributional characteristics" measure[59] of each good. This measure estimates how heavily consumption of a particular item is concentrated on the poor (Sahn and Younger, 2003). In this approach the welfare effect of a price change is given by the weighted sum of each household's consumption of the taxed item(s), where the weights reflect the social marginal value of consumption by each household with higher weights given to the poor households (Sahn and Younger, 2003). This has revealed some very strong tax policy results from micro-data analysis that are very significant for tax policy reforms of GST/VAT in developing countries. For instance, in the case of Papua New Guinea, Gibson (1998) noted that exemptions of rice and tinned fish from GST is desirable on both "merit good" criterion as well as from poverty alleviation objectives. Also, Alderman et al. (1999), found that GST exemption of beans, sugar and kerosene in South Africa is desired from equity point of view. This type of research has raised a question regarding carrying out GST/VAT exemptions under "*a-priori*" belief particularly as far as Government's pro-poor policy agenda is concerned.

Tax progression evidence on trade taxes has largely focused on import taxes. Most tax progression literature finds custom duties as slightly regressive (Jeetun, 1978; SPDC, 2004 for Pakistan; Heller, 1981 for Korea to name a few, but since import tax incidence estimation from survey data is not straight

[59] For application see Gibson (1998) for Papua New Guinea, and Alderman and del Ninno (1999) for South Africa[59] and Sonia et al. (2003) for Ethiopia

forward, tax progression studies have been cautious about these findings). The literature using distribution measures has given attention to both import and export taxes (primarily due to importance of latter type of tax in Africa) and overall results for this study find import duties to be progressive (see Table 3.2) which is contrast to evidence from tax progression studies. Incidence of overall export taxes appears to be neutral/ inconclusive or regressive (see Table 3.2). However, where regressivity is reported this is due to one specific item (for instance, cocoa export tax for Ghana and coffee tax in Uganda).

Another important point highlighted in recent research is the definition of the "*poor*" used in most of these studies. This is an important point since it involves understanding the extent and nature of variation among those classified as the "poor" (Bird and Zolt, 2005) as these differences can be very important for policy decision as far as the poor are concerned. However, this issue has received considerably less attention due to lack of availability of surveys that explicitly focus on the poor. However, there are some notable exceptions. For instance, Adler, et al., (1952) reports considerable variation in families between the same income classes in Guatemala. They find that heavy drinkers and smokers probably paid 3 percent of their income in taxes compared to 1 percent for moderate consumers and 0 percent for abstainers. Bird and Miller (1989) used micro-data from a special survey in Jamaica on the poor. They report that effect of taxation may vary more due to characteristics of the poor households then to income or expenditure. Perhaps more importantly, the gain in vertical equity may offset increased horizontal inequities if such issues are not analysed carefully. Thus, a more detailed focus on the characteristics of the poor is essential in order to rightly estimate the effect of indirect taxes on the poor as well.

In summarizing, this evidence has revealed that generalization regarding progressivity, regressivity or neutrality of this or that tax is *not* helpful (Bird and Zolt, 2005). If research in this area is to be more revealing and interesting from policy perspective, the right questions need to be asked. Even though indirect taxes may have a very little redistribution role, such impact can be very powerful as far as the poor are concerned. Thus, detailed micro-data analysis along with information on tax structure is required to fine tune particular policy features that may be very important for the poor (such as taxes on kerosene, basic fuels, sugar, tobacco, cocoa etc.). Thus, even though the incidence of any single tax is less important than the incidence of the fiscal system as a whole, nonetheless there is good reason for those concerned with distributive issue to pay close attention to the details of indirect tax design and administration (Bird, 1987).

3.2.2 Pakistan Tax Incidence Studies

Most of the literature on incidence of taxation in Pakistan has focused on tax progression of overall tax system. Results and overall findings of these studies are summarized in Appendix Table 3.1 and 3.2.

One of the earliest studies of tax incidence for Pakistan is Jeetun (1978)[60]. This study was done following the Pechman and Okner (P&O) (1974) methodology and almost following the same set of assumptions for allocation of taxes. Jeetun's (1978) results showed that total tax incidence and total indirect tax burden exhibited either slight progressivity or a U-curve pattern (i.e. implying redistribution taking place from the very poor and the rich

[60] One of the earliest study for Pakistan tax incidence is by Jawaid Afzar "Theory and Practice of Tax Incidence in Pakistan" (1974) is a PhD dissertation but was not available to us.

classes towards the middle income classes). He also found urban classes bearing a higher proportion of tax incidence than rural classes. The novelty of this study was that it was one of the first studies that covered the issue of tax incidence in Pakistan and also provided detailed disaggregated results based on incidence of components of tax system.

Kazi (1984) aimed at analysing inter-sectoral tax burden for Pakistan. For this reason, although the analysis is similar to conventional P&O type of methodology, the expenditure and taxes allocation takes place on the basis of sectoral expenditure shares and sectoral population. Their results showed over-taxation of agriculture when compared with the relative capacity of taxation in each sector. They also found that rich farmers in agriculture sector are under-taxed.

Malik and Saqib (1989), also employ P&O (1974) type of methodology to allocate the tax burden. However, tax burden allocation is further refined to take account of cascading effect of taxes by using the input output tables for (1975-76). They also explicitly address the question of redistribution of income due to taxes using the Suite index. Although they report the entire tax system to be regressive (pp.18), the results at best appear to be U-shaped particularly at national level.

Shirazi et al., (2001) is perhaps the only study that attempts to ascertain the fiscal incidence for Pakistan. They also use P&O methodology to allocate tax burdens and expenditure benefits. The shortcoming of this analysis is the arbitrary way the expenditure and tax burden is distributed across the population. As a result the findings for the poorest cohort look particularly dubious.

Kemal (2001) reports the tax incidence results for the overall tax system for 13 years (1987-88 to 1999-00). However, this analysis can be only indicative because this study explicitly says nothing about the data, methodology and assumptions used in this tax incidence study.

The novelty of Refaqat's (2003) VAT analysis is that although it uses the conventional methodology it drops the assumption of proportionality between tax burden and tax revenues. This study shows that GST/VAT appears to be slightly regressive when income is used as a base but this regressivity disappears when expenditure is used as incidence base. The other important aspect of this study is that it provides a comprehensive breakdown of VAT incidence on main commodities including important items such as cooking oils, kerosene oils, electricity etc. It appears that disaggregated findings are not particularly sensitive to the choice of base. It appears tobacco tax, kerosene oil, gas-pipe and electricity consumption taxation under GST are highly regressive.

SPDC (2004) is another comprehensive look at federal taxation in Pakistan. This study also uses the conventional incidence approach but like Refaqat (2003) drops the proportionality assumption. This study finds all components of indirect tax system along with the overall tax system clearly regressive. The study finds if fertilizers and pesticides are exempted from GST net, it will make GST incidence slightly progressive. The novelty of the study is to attempt to measure effective taxation; however, this study uses 1989-90 input-output tables for Pakistan and provides no information on how these tables were updated for 2001-02, which makes this study quite susceptible.

Thus, it will not be wrong to say that most of the research in Pakistan has remained preoccupied with the tax progression issue and as a result most of the issues highlighted in the earlier section have very little attention in

Pakistan. And this gives current study an opportunity to undertake some of the issues mentioned earlier.

3.3 SECTION III: Normative Analysis [61]

In the previous sections we talked about partial equilibrium approach and compared results of studies on tax incidence in developing countries on the basis of tax progression. The focus on this section and following section is how tax incidence studies might inform policy concerned with the normative[62] question of how social welfare is to be maximised. However, much of the normative tax incidence literature encompassing the theory of optimal taxation and the theory of marginal tax reform (MTR) (discussed in next section) is sensitive to the underlying assumptions regarding tax incidence (such as cross price elasticities assumption, Ramsey rule etc.). Some of these assumptions may or may not be true. This further highlights the importance of partial equilibrium tax incidence analysis discussed in the first two sections. However, the current and the following section discuss some general lessons emerging from this literature that may be very useful for policymakers in developing countries along with there limitations.

3.3.1 Optimal Taxation

[61] Since the focus of current study is not normative analysis of taxation we do not claim to review studies in this area. Our intuition behind this section is to draw upon some reliable tax policy recommendations rather than to focus on individual studies. For a comprehensive review of normative studies, see the seminal collection in Newbery and Stern (1988).

[62] According to Gemmell, (1987) *normative* analysis raises the question of which taxes should be preferred. In addition to the knowledge of how taxes affect the economy and income distribution, they also require knowledge of specific policy objectives such as economic growth, fair distribution of resources etc.

One of *the* most prominent theories within this area is the theory of optimal taxation. The theory of optimal taxation is based on the principle of Pareto optimality[63] and it uses the tool of welfare economics to pinpoint an allocation of resources that will maximize the social welfare function (Gemmell, 1987).

It is true that the starting point of the theory of optimal taxation is the breakdown of the basic theorems of welfare economics. The first theorem states a competitive equilibrium is Pareto efficient and the second theorem states that any prescribed Pareto efficient allocation can be achieved as a competitive equilibrium if prices are set appropriately and if individual lump-sum taxes[64] or transfers are possible. Since it is *not* possible to create individual specific lumpsum taxes (Mirrlees, 1976) we move into the *second best* world and the need to develop the theory of optimal taxation.

The concept of optimal taxation is not intuitive. However, it is nicely summarised by Sandmo (1976) who suggests three criteria to explain optimal taxation:

i. A tax system which minimizes the resource cost of assessing, collecting and paying taxes.
ii. Alternate tax system can be ranked following some criteria of fairness.
iii. It is possible to evaluate tax system in terms of economic efficiency.

Given individual specific lump-sum transfers are not possible; we move into a world of commodity and factor taxes. In its early stages the theory of optimal

[63] One allocation is said to be Pareto dominate than other if it makes every consumer at least as well off and at least one better off (Fuente, 2000:369)
[64] Lump-sum tax on an individual is a payment that the individual cannot alter by action (Newbery and Stern, 1988: 25).

taxation was completely preoccupied by efficiency concerns as summarized by Ramsey (1927) who was the first one to provide the solution of raising revenue by indirect taxes only in a one person economy when lumpsum transfers are ruled out. Assuming a one person economy (or identical consumers who can be treated identically) is equivalent to assuming distributional concerns that do not matter. Thus, according to the Ramsey rule, a given amount of taxes can be raised at minimum cost if taxes as a proportion of commodity prices are set inversely proportional to the elasticity of demand (Newbery and Stern, 1988). However, this makes this rule rather in-egalitarian as it appears to direct commodity taxation towards necessities (Newbery and Stern, 1988). Although the Ramsey rule provides general intuition behind the optimal taxation framework, it does not give any explicit formula for the calculation of optimal taxes.

Much of the extension and development of this theory came during the decade of 1970s with seminal contribution by Diamond and Mirrlees (1971a, 1971b) who extended Ramsey rule to a many person rule, proved the *production efficiency theorem*[65], and brought forward a discussion regarding optimum. In cases where all cross price effects are assumed to be zero, this leads us to derive a well known result known as the *inverse elasticity rule*. Other significant contributions that have moved this theory forward come from Atkinson and Stiglitz (1972), Deaton (1977), Ray (1986), and Kaiser and Spahn (1989). However, the mathematics of optimal tax theory is complex; results are often not intuitive and governed by many restrictive assumptions regarding the structure of preferences and the set of tax instrument allowed (Gemmell, 1987).

[65] Production efficiency theorem asserts that goods that enter into production processes as inputs and intermediate goods must not be taxed.

One of the empirical studies that has done away with much of restrictive assumptions is by Ebrahimi and Heady (1988) who allow for non-uniform preference, non-separability between goods and leisure, and other tax instruments. The result emerging from their study is that the cost in terms of social welfare of ignoring optimal tax theory recommendations and imposing uniformity in the indirect tax structure is fairly small in terms of GNP.

Other important studies that have exposed a vast array of problems in this area include Murty and Ray (1987), who show extreme sensitivity of optimal tax rates calculations to deviations from leisure and good assumption; Ray (1986) who show calculations to be very sensitive to alternate functional form; and Deaton and Stern (1986) who shows that incorporating equity considerations moves optimal tax rates further from uniformity. Baumol and Bradford (1970) and Atkinson and Stiglitiz (1980) criticise the assumption of zero cross price effects which according to them translates the general equilibrium analysis into a partial one equivalent to the problem of minimising excess burden in such a framework.

As a result of difficulties with methodological and practical differences as well as problems with restrictive set of assumptions led to the development of theory of marginal tax reform (MTR) developed by Ahmad and Stern (1984; 1987).

However, despite these problems the optimal taxation literature does offer some general lessons to tax policy. Newbery and Stern (1988:49) summarized these as three general principles which might be very useful for tax policy formulation in either developed or developing countries.

i. ‘Tax revenue is raised most efficiently by taxing goods and factors with inelastic demand or supply’. This follows from the earlier discussion on

the deadweight loss and because effects external to the good or factor being taxed are minimized (Gemmell, 1987). Thus, 'Care should be taken with the pattern of complement and substitutes'.

ii. 'Taxation concerned with distribution and with externalities or market failure should as much possible go to the root of the problem'.

iii. 'We must recognize that it will be impossible to deal perfectly with the questions of distribution and market failure directly'. As a result we need to carefully ascertain 'how any particular policy affects all of our objectives-including distribution' since 'optimal policy for any one tax will often by very sensitive to assumptions concerning the availability and levels of other taxes'.

3.4 SECTION IV: Marginal Theory of Tax Reform: A Bridge between Positive and Normative Analysis

The theory of "tax reform" is interested in marginal changes from the status quo that can be welfare enhancing (Newbery and Stern, 1988). The practical appeal of the theory of marginal tax reform (MTR), particularly in developing countries, is that the policy makers rarely have the privilege of designing tax structure from scratch or of introducing extreme changes in tax structure. Thus, in many cases policy makers are interested in knowing empirically robust and theoretically consistent suggestions for improvement over the status quo. And in this lies the practical appeal of the theory of marginal tax reform. The theory of marginal tax reform was developed by Ahmad and Stern (1984); it is based on the optimal taxation framework and presents a structure for considering beneficial reforms to an existing tax system (Gemmell, 1984).

Ahmad and Stern (1984; 1987) developed the methodology for finding desirable welfare-improving directions of marginal tax reform from a status-quo, which need not be optimal. The theory assuming that a government maximising a social welfare function W (i.e. Bergson-Samuelson type), under perfect competition and constant return to scale in production, ensures that indirect taxes are fully passed on in the market price. Consequently, an increase in the tax of a commodity, t_i, will raise consumer price by an equal amount leaving producer prices p_i constant. Given that government wants to raise one rupee in revenue at a rate $\partial R/\partial ti$; the effect on social welfare will be $\partial W/\partial ti$. This effect, λ_i or the marginal social cost (MSC) can be written as

$\lambda_i = -(\partial W/\partial t_i)/(\partial R/\partial t_i)$, $\quad R = \mathbf{t}\cdot\mathbf{X}$ $\quad$ 3.1

where **t** is the vector of taxes and **X** is the aggregate demand vector. Equation 3.1 shows that a tax reform $\Delta\mathbf{t}$ will be beneficial as long as it fulfils $\Delta W>0$ and $\Delta R \geq 0$ i.e. welfare increases without decline in revenue. As long as the present taxes are not-optimal (i.e. λ_i's or the marginal social cost (MSC) are not equal), there must be at least one welfare improving tax change (Gemmell, 1987). The general idea is that tax on the good with a higher MSC should be lowered while that on a good which has lower MSC should be raised (Madden, 1995). In general we should not expect uniqueness from the whole collection of beneficial reforms (Newbery and Stern, 1988). However, if we define optimum as a state no beneficial reform can be identified then this would mean that all λ's are the same. Thus, the theories of optimality and the theory of marginal tax reform are very close (Newbery and Stern, 1988).

According to Ahmad and Stern (1984), it is possible to show that $(\partial R/\partial t_i)$ is a function of responses of aggregate demand to changes in t_i and the vector of tax rates. It was shown by Ahmad and Stern (1984) that aggregate demand changes responses must be considered as long as price effects are significant and different from zero. Having defined a social welfare function (SWF), $\partial W/\partial t_i$ can be estimated using household consumption patterns and welfare weights attached to household's utility in SWF and $\partial W/\partial t_i$ will be sensitive to what is being consumed by the 'poor' and the 'rich' and value judgements related to preferences of equality in the society (Gemmell, 1987).

According to Madden (1995) this approach has considerable advantage over the theory of optimal taxation as it does not require the choice of explicit utility functions or explicit model of distribution of income. What it requires is

information on the actual position of the economy at that time, using actual aggregate consumptions rather than individual demand responses.

Ahmad and Stern (1984), using data on household consumption for nine consumption goods and taxes for India 1979-80, estimated λ_i's for these nine groups. They found ranking of λ_i's to be very sensitive to the inequality aversion parameter used. Under no inequality aversion, they found the existing tax structure to be optimal; however when a higher inequality aversion was used there was always at least one welfare improving reform.

Ahmad and Stern (1987; 1991) in addition to identifying welfare improving direction of reform also provide a methodology for solving the 'inverse optimum problem'[66] and this detailed empirical study is extended to Pakistan in addition to India. The concept of MTR theory is extended to incorporate effective taxes and shadow prices[67]; which they illustrate by calculating effective taxes and shadow prices for 87 sub-sectors for Pakistan and 90 sub-sectors for India. They calculate marginal social cost (MSC) for nine commodity aggregation for India (based on demand system estimates taken from the Radhakrishna and Murty (1981) study) and thirteen commodity groups for Pakistan (taken from Ahmad, Ludlow and Stern (1988) estimates based on food and clothing items categories and other estimates from earlier work of Ahmad and Stern (1986), Ahmad, Coady and Stern (1988) and Ahmad, Ludlow and Stern (1988)). The demand systems for Pakistan and India were both estimated using the linear expenditure system using cross sectional data. The main results from the studies are as follows:

[66] Inverse optimum problem can be defined as computing the set of social welfare weights for which the existing tax system would be optimal.
[67] The shadow prices represent the element of tax (or subsidy) in percentage term that each good is subject to. Ideally, this price should be set by taking into account tariffs, taxes, subsidies and other transfers; all of which contribute to the determination of domestic price of a good (Deaton, 1997).

- Taxes on fuel, sugar and other food appear to result in consistently high social cost.
- Taxes on milk and milk products, meat, fish and edible oils appear to entail low social cost.
- The author finds λ's to be very sensitive to the level of inequality aversion used.
- When only efficiency considerations are given prominence results appear to support inverse elasticity rule.
- Solving for inverse optimum problem reveals that Pareto-welfare improving reforms are possible and the authors identify two such reforms. They also show that marginal tax reform theory results are much less sensitive to model specification and parameters estimates compared with non-marginal reform[68].

Even though the marginal theory of reform provides a unique opportunity of *ex-ante* tax policy planning and reform analysis, its application due to data problems has been largely limited to developed countries[69]. The sensitivity of MSC ranking to elasticity parameters like Ahmad and Stern (1984; 1987; 1991) is also supported by Madden (1989). Cragg, 1991 reports the MSC ranking of 10 commodity groups in Canada. He reports that if the Government gave more importance to equity; it would be desirable to increase taxation of recreation, electricity, tobacco and communication while lowering taxation of alcohol, food, fuel, gas and reading materials. The explicit issue of modelling externalities in such model is undertaken by Irvine and Sims (1993) for Canada. The novelty of the study is calculation of MSC ranking of 19 alcoholic beverages for different values of the externality corrective charge.

[68] Due to its appeal and relatively small informational requirement the theory of MTR has been used extensively for instance see Decoster and Schokkaert (1989) for Belgiam, Madden (1989, 1995 and 1997) for Ireland, and Cragg (1991) and Irvine and Sims (1993) for Canada.
[69] For application in developed countries see Madden (1989;1995;1997), Cragg (1991), Irvine and Sims (1993), and Kaplaoglou and Newbery (2003a; 2003b).

Madden (1995;1997) extends the Ahmad and Stern (1984) model of indirect tax reform for Ireland to a corresponding concept of *marginal revenue cost* (MRC) (i.e. reciprocal of MSC). The novelty of this analysis is the inclusion of labour supply in the original model so that the underlying consumer demand and labour supply responses have to be jointly determined using a commodity demand-labour supply model. The important finding is that author provides empirical support for Deaton's (1987) theoretical conjecture, as his results show that the recommendation of marginal tax reform theory are less sensitive to the assumption of separability compared with those that are derived from optimal tax rates[70]. An important issue of separability of consumption patterns between income groups is also assessed by Kaplaoglou and Newbery (2003a; 2003b). Estimation is carried out for 12 commodity aggregation level. Their findings reveal that consumption patterns in Greece are not sufficiently differentiated to allow for an important distributive role to the indirect taxes.

We can see from the discussion above that, except for Ahmad and Stern's seminal work, most of the work on marginal tax reform has largely focused on the developed countries. Estimation of consumer behaviour requires accurate and robust price information based on historical time series data on prices but this information has been generally unavailable for most of the developing countries. As a result, some researchers in developing countries have resorted to using unit values, ratio of expenditure to quantities, directly for estimation of price elasticities (for instance see Deaton, 1988; Timmer and Alderman, 1979; Timmer, 1981; and Pitt, 1983), while others have relied on using fairly restrictive systems such as linear expenditure system (for example Ahmad and Stern's own seminal work). However, both methods are not free from serious

[70] Though Madden 1997 reports results do not appear to be sensitive to the inclusion of conditioning variable but results do appear to be sensitive to the choice of the conditioning variable used.

problems. For instance, unit values cannot be directly treated as market prices because unit value reflects quality choices as well as the effects of price and income of consumers (Deaton, 1988). And using a restrictive demand system which assumes preferences to be additive, tax reform prescription tends to be quite simple and in most cases "under these assumptions, empirical analysis is unnecessary, since the answer is predetermined" (Deaton, 1987).

Although, application of marginal theory of tax reform particularly for developing countries is at very elementary stage of development (as mentioned above) use of survey data does provide a unique opportunity to move discussion further in the area of ex-ante analysis of price and tax reforms in developing countries. Also, marginal theory of tax reforms provides some useful theoretical underpinning of this rather than *ad hoc* tax reforms that have been carried out in many developing countries which have solely focused on revenue and administrative aspect while completely neglecting the social welfare aspect of these reforms (Gemmell, 1987).

3.5 SECTION V: Conclusion

The aim of this chapter has been to review range of literature that is important for my research. The first section discussed partial equilibrium tax incidence approach, its limitations and how some of fundamental concerns associated with this approach have been mitigated by researchers. The second section of this chapter has tried to show that despite the fact that *no* two tax incidence studies are the same, some inference from partial equilibrium tax incidence literature is possible, if evidence is summarized in terms of tax progression. The third and fourth sections of this chapter have tried to highlight how tax incidence analysis can inform policy concerned with normative issue of how social welfare should be maximised. These sections have also tried to show sensitivity of normative tax incidence analysis to its underlying assumptions, which may or may not be true. And this, we believe further highlights the importance of undertaking partial equilibrium tax incidence analysis.

Since the aim of this study is social incidence of indirect taxation in Pakistan, given the data availability and our research question, we believe the literature survey has highlighted that partial equilibrium tax incidence approach is adequate. However, there are some limitations, particularly relating to inability of this approach to incorporate certain features of developing countries such as informal markets, corruption etc., thus cautious interpretations of the results is warranted.

This literature survey has highlighted another important aspect that pre-occupation with the progressivity, regressivity or neutrality of *this* or *that* tax has failed to make use of the *very* feature of partial equilibrium tax incidence approach that is also its strength i.e. ability to disaggregate. We believe this

survey has highlighted the importance of asking the *right* questions for research, such as impact of particular *type* of reform process on progressivity of the underlying tax structure overtime etc., along with the importance of further disaggregating the tax incidence results in order to better inform the tax policy decisions. A large literature on tax progression has shied away such *minute* and explicit focus on taxation of particular commodities that may be more important for the poor. We believe this further disaggregation is vital and must be explored; as a result, this study will follow this approach.

The discussion on normative analysis of tax incidence analysis by incorporating the theory of optimal taxation as well as the marginal theory of tax reform, has tried to highlight that despite the wider appeal of this approach, results are sensitive to the underlying tax incidence assumptions which may or may not be true. The prescriptions in optimal tax theory are sensitive to assumption about own- and cross- price elasticities, e.g. the Ramsey rule is premised on the assumption that cross- price effects are zero. We believe this is a critical assumption and more research particularly in the developing countries needs to go into the estimation of own- and cross- price elasticities, given these estimates are critical for ex-ante tax policy reforms analysis. This estimation may also be very important given partial equilibrium tax incidence analysis is often criticised for the way demand responses are treated i.e. *via* ad-hoc tax shifting assumptions. We believe estimation of price elasticities can really help show how sensitive results from these models really are and shed light on further credibility of this approach. Thus, this study will attempt to estimate own- and cross- price elasticities to contribute to this discussion.

Additionally, although it is evident from the literature on the theory of marginal tax reforms in developing countries, that this literature is at its early stage of empirical development but literature review has also shown that this

area (despite its limitations) provides a unique opportunity for *ex-ante* tax reform analysis and planning. The operational and data requirements of this approach are much less intensive than the theory of optimal taxation and results may be much more relevant for the policy makers in developing countries. As a result, we believe estimation of demand responses is also necessary to take debate further from tax progression to analysis of tax reform and planning analysis. This study will attempt to do that for Pakistan.

Given that partial equilibrium tax incidence analysis is deemed adequate in the light of literature survey for our research question, the next chapter deals in detail with the micro-data set that will be used in this study.

CHAPTER IV: Data Issues and Methodology

4 Introduction

The aim of this chapter is to discuss the data and methodological issues pertaining to this study. The primary data source that will be used in this study is the Household Integrated Economic Survey (HIES) for 1990-91 and 2001-02 both of which are micro cross-sectional data sets collected by the Federal Bureau of Statistics (FBS) Pakistan. These data sets provide extensive information on household income and expenditure patterns in Pakistan. As already discussed (in the previous chapter) given the aim of this study, partial equilibrium tax incidence approach appears to be adequate. Thus, this study will proceed with tax incidence analysis at micro level and issues related to data set are discussed in this chapter.

This chapter is divided into three main sections. The first section presents an overview of the underlying data source. The second section talks about how information present in the HIES data set is used to construct a household expenditure aggregate and discusses other methodological issues related to this calculation. Section three presents the estimates of household welfare in the pre- and post-reform era followed by, section four which presents a disaggregated view of household expenditures in (1990-91) and (2001-02). The aim is to show how expenditures have changed over time and identify various expenditure categories (based on expenditure patterns) as necessities or luxuries. Section five concludes the discussion.

4.1 Data and related issues[71]

The Household Integrated Economics Survey (HIES) has been conducted by the Federal Bureau of Statistics (FBS) Pakistan, with some breaks from time to time since July 1963. It is the main data source for: (a) providing data on household income and expenditure; and (b) for estimating household saving and liabilities (Asian Development Bank, 2006). HIES survey prior to 1998-99 used to be an independent survey but in 1998-99 it was merged with Pakistan Integrated Economic Survey (PIHS)[72] and as a result the last two HIES surveys- 1998-99 and 2001-02- were collected together with PIHS survey.

The HIES 1990-91 and PIHS/HIES 2001-02 sample consists of 6,516 and 14,713 households respectively and this ample is considered to be sufficient to give estimates of key variable at national and provincial level at 95% level of confidence interval with 5-7 percent margin of error (FBS, HIES 01-02, pp. 21 and FBS, HIES 90-91, pp. 15) [73]. Further information on sample size and allocation is given in Table 4.1 below.

[71] For detailed information on the HIES design and sampling methodology, please see Appendix 4.1.
[72] The PIHS was first started in (1995-96) with an intention of providing estimates to monitor Government social action program (SAP).
[73] For HIES (1990-91) and (2001-02), 123 and 90 households respectively could not be enumerated for various reasons (FBS, HIES 1990-91, pp. 16; FBS, HIES 2001-02).

Table 4.1: Household Distribution (both Survey's)

	Total Households: (1990-91)					Total Households (2001-02)				
Punjab	3,192	*50%*				6,313	*43%*			
			Urban	1,258	*39%*			*Urban*	2,544	*40%*
			Rural	1,934	*61%*			*Rural*	3,769	*60%*
Sindh	1,663	*26%*				3,707	*25%*			
			Urban	837	*50%*			*Urban*	1,533	*41%*
			Rural	826	*50%*			*Rural*	2,174	*59%*
NWFP	905	*14%*				2,668	*18%*			
			Urban	390	*43%*			*Urban*	842	*32%*
			Rural	515	*57%*			*Rural*	1,826	*68%*
Balochistan	633	*10%*				2,025	*14%*			
			Urban	233	*37%*			*Urban*	621	*31%*
			Rural	400	*63%*			*Rural*	1,404	*69%*
	6,393					**14,713**				
			Urban	2,718	*43%*			*Urban*	5,540	*38%*
			Rural	3,675	*57%*			*Rural*	9,173	*62%*

Source: Authors own calculation using HIES (1990-91) & (2001-02).

Accordingly, this translates into following distribution of population for these years:

Table 4.2: Distribution of Population (as % of total Population)

	2001-02		
	Urban	Rural	Total
Punjab	0.17	0.43	0.60
Sindh	0.10	0.14	0.24
NWFP	0.02	0.11	0.13
Balochistan	0.01	0.03	0.04
Total	**0.29**	**0.71**	**1.00**
	1990-91		
Punjab	0.17	0.46	0.63
Sindh	0.11	0.12	0.23
NWFP	0.02	0.09	0.11
Balochistan	0.01	0.02	0.03
Total	**0.31**	**0.69**	**1.00**

Source: Authors own calculation using HIES (1990-91) & (2001-02).

Thus, according to Table 4.2, in 1990-91, 69 percent of population resided in the rural areas while 31 percent of population lived in urban areas. In terms of distribution of total population on provincial basis, 63 percent of total population lived in Punjab, 23

percent in Sindh, 11 percent in NWFP and around 3 percent in Balochistan. According to HIES (2001-02) estimates, surprisingly the rural share of population slightly increased to 71 percent while urban share declined to 29 percent. On provincial basis, population slightly declined in Punjab while it slightly increased in all other provinces.

If we compare this with Population Census for Pakistan (1981; 1998), according to the census estimates the share of urban population in Pakistan increased from 31 percent to 33.6 percent while rural population on the other hand decreased from 69 percent to 66.4 percent respectively. Thus, although, 1990-91 HIES survey population distribution estimates are quite accurate, it appears 2001-02 HIES survey is slightly over-estimating rural population and under-estimating urban population overtime[74]. This is quite surprising given the migration and urbanization that has been taking place in Pakistan. This anomaly according to ADB (2006) is related to the urban sampling frame of HIES (2001-02) survey. The problem is that although the rural sampling frame (as mentioned earlier) has been updated but the urban sampling frame has not been updated since 1995. As a consequence HIES (2001-02) survey appears to overestimate the rural population (World Bank 2002; ADB 2006).

4.1.1 HIES (1990-91) and (2001-02): Developments over time

Although various HIES surveys are collected by the same organization intended to capture the same information yet over the years there have been some changes in data collection methods and questionnaire design. These include:

[74] Arif (2003) also reports a slight decline in percentage of households or individuals in urban areas based on the results of HIES and PIHS for (1995-96) and (2001-02).

(a) HIES (1990-91) survey like its predecessors was collected by a single male enumerator interviewing only the male members of the households but after the PIHS/HIES merge[75], subsequent HIES surveys have been collected by a mobile team of male and female enumerators under day to day management of a team supervisor which allowed the team to interview both the male and the female members of the households. This has definitely improved the quality of data collection overtime since in Pakistan, females members are at the centre of day to day household management.

(b) After PIHS/HIES merge, minor expenditure categories that were considered obsolete were either removed or merged with other categories. It is generally agreed that such minor changes should not effect the direct comparability between both the HIES survey (FBS 2001 and World Bank 2002).

(c) There has been a change in the recall period of some categories (see for instance Table 4.3). In HIES (1990-91) all food expenditure items were recalled on monthly basis while in HIES (2001-02) most of these are recalled on fortnightly basis. Although this can possibly have some affect on comparison of both surveys it is not likely to be too dramatic. For instance, according to Deaton (1997, pp26) "we should perhaps not be too concerned with the discrepancies that are attributable to differences in reporting periods, at least over the practical range".

(d) It is also argued by Kemal (2003) that HIES and PIHS surveys understate the income accruing to the highest income group. In some cases it is also reported that poorest households are also inadequately represented or systematically excluded particularly those that are homeless and illiterate (Zaidi, 1992; Gazdar, 2000); while some have pointed towards possible underreporting at both *tails* (Jehle, 1990). However, this issue is not just an issue pertaining to HIES but it is often argued that this is a common observation about large surveys in general (ADB, 2006).

[75] i.e. HIES (1998-99) and (2001-02).

Thus, it must be mentioned here that most of the issues mentioned above are not that serious particularly in the context of this study, which is interested in measurement of tax incidence *not* poverty or inequality since data comparability requirements for latter types of analysis are much more stringent.

Additionally, it needs to be mentioned that HIES survey overall is very good quality cross sectional data source. Over the years this survey has been used intensively by domestic and foreign scholars, and government and multilateral agencies. For instance see, (Ahmad and Stern (1987; 1991), Deaton (1987; 1997), Deaton and Grimard (1992), Alderman and Garcia (1993); Malik (1988); Aamjad, et al. (1997); Jafri (1999); Anwar et al. (2005); Kamal et al. (2003); World Bank (1995; 2002); ADB (2006); CRPRID (2003; 2005; 2006), to name but a few.

Table 4.3: Expenditure questionnaire of HIES (1990-91) and (2001-02)

Expenditures	1990 - 91		2001-02	
	Frequency	Respondent	Frequency	Respondent
1. Food items				
a. Milk and milk products b. Meat and fish c. Poultry d. Fresh fruits e. Vegetables f. Dry fruits & nuts g. Condiment and Spices h. Sugar, honey and sugar preparation i. Non-alcoholic bev. j. Ready made food and drinks	Monthly	Male	Fortnightly	Female
k. Cereals l. Pulses (split & whole) m. Edible Oils & fats n. Tea and coffee o. Baked and fried products p. Misc. food items	Monthly	Male	Monthly	Female
2. Tobacco and chewing products	Monthly	Male	Monthly	Male
3. Fuel and lighting	Monthly	Male	Monthly	Male
4. Misc. expenses a. Personal care articles b. Personal care services c. Household cleaning articles d. Recreation and reading e. Personal transport and travel	Monthly	Male	Monthly	Female
f. Other misc. household expenses	Monthly	Male	Monthly	Male
5. Apparel, textile, footwear and personal effects	Annual	Male	Annual	Male
6. Housing a. House Rent and Housing expenses b. Chinaware, earthenware etc.	Annual	Male	Annual	Male
7. Misc. Expenditure Non-Durables a. Medical Care b. Recreation c. Transport and Travel d. Educational and Professional expenses e. Other misc. expenses	Annual	Male	Annual	Male
8. Household Durable Expenses	Annual	Male	Annual	Male

Source: HIES questionnaires 1990-91 and 2001-02

We now move to talk about other methodological issues pertaining to measurement of household welfare aggregate.

4.2 Issues in Constructing Household Welfare Aggregate using HIES data

4.2.1 Unit of Analysis

The term unit of analysis refers to the unit with reference to which the welfare and tax analysis will be undertaken. This study takes household as the basis of measurement[76]. Thus, by doing so we are implicitly assuming that all household resources are pooled and shared equally among all household members. This is a simplistic assumption not necessarily a realistic one (Blundell et al., 1994; Creedy 1998; Hoddinott and Haddad, 1995).

4.2.2 Per Capita or Adult Equivalent

It is important to point out that the welfare as well as tax incidence analysis in this study uses the 'per capita' (i.e. dividing by family size) basis insread of the 'adult equivalent' basis. This is because, in the case of Pakistan, there is no single official definition of adult equivalent which makes such analysis difficult.

4.2.3 Measurement of Household Welfare

[76] According to the FBS, a 'household' is defined as either a single person household or a multi-person household. A single person household is one where the individual makes provisions for his/her own food and other essentials of living, without combining these resources with any other person and has no usual place of residence elsewhere. A multi-person household on the other hand is defined as a group of two or more person who make some common provision for food or other essentials of living and which has no usual place of residence elsewhere. Thus, the persons constituting the group may pool their incomes and have a common budget to a greater or lesser extent; they may be related or unrelated or a combination of both...

Since the aim of the present research is to evaluate the indirect tax system, its progressivity, etc. the issue of measurement of welfare is required for ranking households in terms of welfare. Thus, even though measurement of welfare is *not* central to this research, adequate approximation of welfare is required to carry out tax incidence analysis in this study. However, it may not be wrong to say that our concern regarding welfare is primarily concerned with measuring the economic component of standard of living Deaton and Grosh, 2000). Thus in doing so we do not claim to cover any non-economic components of living standards, such as health, education, political freedom etc., which can be equally important but cannot be adequately captured by any simple monetary measure (Deaton and Zaidi, 2002). Our discussion here will mainly focus on two most prominent and commonly used indicators of well-being; income and consumption[77].

The choice between annual income and consumption as an indicator of welfare is a frequently debated and discussed issue. It would not be wrong to say that both are two different concepts *not* just two different ways of measuring income (Deaton and Grosh, 2000). For instance, income together with assets measures a person's or household's potential claims on the economy while consumption measures what people actually acquired (Deaton and Grosh, 2000). However, both can be defended as approximation to utility; and as a result has been extensively used for analysis.

There is no doubt that average income in the long-run is the most appropriate indicator of living standard (Anand and Harris, 1990). In longer term, such as lifetime, the average level of consumption (including bequests) must be equal to the average level of income (including inheritance); thus the choice between the two, does not matter (Deaton and Zaidi, 2002). However, over a shorter reference period such as one year, there is reason to believe that short-run income may be a poor proxy of long term income. The main problem with using annual income data is that on a

[77] The aim of this section is *not* to provide exhaustive survey of this argument but only to highlight some of the main points. For an exhaustive survey, see e.g. Anand and Harris (1990), McGregor and Borooah (1992).

short term it can suffer from high fluctuation and sometimes this variability is present even across years. (Deaton, 1997).

In the view of such criticism current consumption has received much attention as a better indicator of welfare particularly for developing countries: (a) there is substantial evidence that even where income fluctuates a great deal in short term, consumption is relatively smoother and less variable than income (Chaudhuri and Ravallion, 1994); (b) there is empirical evidence supporting income smoothing in poor agricultural societies with limited ability to borrow (Paxson, 1992;1993; Deaton, 1997) ; (c) in countries with substantial agriculture sector, self-employment and informal sector, it is impossible to get a credible income measure without multiple seasonal visits to the households; something that is rarely done (Deaton and Zaidi, 2002;; Havinga et al, 1989; Malik 1991; and Younger, 1999); (d) consumption of certain items follows life cycle pattern which is independent of changes in income (Modigliani and Brumberg, 1954) and ; (e) for evaluating the impact of price, subsidy and taxation policies where the main concern is the price changes caused by policy changes; consumption data is invaluable (Deaton and Grosh, 2000). Since all these issues are very important particularly for developing countries, this study like many others has opted to using current consumption as a measure of welfare.

4.2.4 Measurement of Household Consumption aggregate?

After having decided (based on discussion in the preceding section) that this study will use consumption as measure of household welfare, we are now in a position to move this discussion forward on how this study will construct the real value of total household consumption that will be used as the indicator of households standard of living.

4.2.4.1 What is included in Household Consumption aggregate?

Since this study uses expenditure as an indicator of household welfare it is important to explicitly address the question what this indicator includes. The HIES survey consists of expenditure on food, non-food, durable and non-durable items (for example see Table 4.3 for further detail). Essentially total household expenditure must contain all types of expenditure brought to a common frequency (annual in our case) with a few exceptions[78]. Another important aspect is the *types* of expenditures. HIES survey contains information on two broad types of expenditures; namely *paid & consumed* and *unpaid & consumed* [79]. Such distinction in consumption type can be of importance for developing countries. Thus, although both types of expenditure are included while calculating the household welfare indicator, tax liabilities are calculated only with reference to the market purchased expenditures.

4.2.4.2 Dealing with Household durable expenses

[78] Exceptions normally followed are: (a) Expenditure on levies and taxes (such as house and property tax, annual license fee for arms, fines, birth/marriage taxes and annual registration fees) are not included in the welfare indicator since these are essentially not part of consumption but rather a deduction from income (Deaton and Zaidi, 2002). (b) Certain type of health expenses (such as medical fees paid to doctor/specialist and hospitalisation charges) are also excluded from the welfare indicator given if included they will appear to increase the welfare of the household where as in reality opposite has happened (Deaton and Zaidi, 2002). (c) Lumpy expenditures (such as expenditure on food and drinks on birth/marriage/death ceremonies are excluded) because these are "lumpy" and "infrequent expenditures" and ideally should be "smoothed" out but since such information is not available it would be better to leave them out (Deaton and Zaidi, 2002). For instance, Howes and Zaidi (1994) report for PIHS (1991) that less than 8 percent households reported making a dowry payment during the past 12 months but these expenses made up almost 20 percent of their total annual consumption. All of the above expense categories are also not included in our household welfare indicator.

[79] *paid & consumed* refers to a formal market transaction where an item is directly purchased from the market by paying for it and *unpaid & consumed* refers to informal transaction where an item is consumed either via own production, barter exchange, or gift/assistance.

The issue of dealing with household durables expenditures while constructing a household welfare indicator based on consumption is an important and problematic one. It is problematic because for major durable items in short run, consumption and expenditure are *not* closely related to each other; as a result, expenditure is a very poor guide to their consumption as consumption of durable items must be linked to their stock *not* to purchases (Deaton and Grosh, 2000).

Empirically, this issue has been treated broadly in three different ways. (a) Expenditure on durable items is treated *no* differently from other expenditure as a result *no* adjustment is made (Goodman and Webb, 1995); (b) expenditure on the lumpiest items such as cars, home repair is excluded, while other durables are included (Deaton et al, 1989; World Bank 2002); and (c) only expenditure on non-durable items is included (Prais and Houthakker, 1971).

However, for studies explicitly interested in tax incidence analysis, this issue is more complicated because taxation of durable items such as TV, cars, electric fans etc. may constitute a very important part of consumption taxes such as VAT. As a result some proxy of durable good consumption needs to be imputed in order to get the correct tax incidence picture. As a consequence, some studies explicitly dealing with tax incidence analysis have made a specific attempt of imputing flow of durable good consumption from their stock. These studies have made a simplifying assumption that households in a given year only consume ten percent of the current value of the stock of durable items (e.g. Johnson et al., 1989; Younger et al., 1999; Refaqat, 2003) we also follow this procedure[80].

4.2.4.3 Cost of living adjustment

[80] Though it must be admitted that use of such a depreciation/proxy measure is fairly arbitrary.

This brings us to another important issue of cost of living adjustment across household survey. In developing countries the main issue pertaining to the use of household survey data appears to be spatial price variation i.e. people in different parts of the country pay different prices for consuming the same goods which also depends on inflation and seasonality. In many cases spatial price variation tend to be quite large in both the relative and absolute price differences and must be accounted for (Deaton and Zaidi, 2002). In comparison this issue tends to be much less pronounced in household surveys of developed countries because well developed and inexpensive transportation and distribution systems (for most consumer goods) appear to minimize the spatial price variation (Deaton and Zaidi, 2002).

In order to make nominal consumption aggregates comparable across time and space one can use Paasche index (i.e. current weighted), and Laspeyres price index (i.e. base weighted)[81]. We use the Paasche price index because even though both indexes are weighted average of price ratios, the former is weighted by expenditure in the current period while the latter index is weighted by expenditure at the base period. As a result, Paasche index is a preferable price index to adjust cost of living differences (Deaton and Zaidi, 2002).

Following Deaton and Zaidi (2002) we can write the household money metric utility function as:

$$u_m^h \approx \frac{p^h.q^h}{p_p^h} = \frac{x^h}{P_P^h} \qquad 4.1$$

Where u_m^h represent the minimum cost of reaching utility level u^h at prices p^0

[81] Recently a superlative price index i.e. the Fisher Ideal index (which is a geometric mean of Laspeyres and the Paasche index) has also been used for deflation of nominal aggregate but such refinement may make more sense in poverty analysis.

Where Paasche index, $P_p^h = \frac{p^h.q^h}{p^0.q^h}$ 4.2

Or we can rewrite equation (4.2) intuitively in terms of how actually it will be calculated using household survey data

$$P_i^P = \left(\sum_{k=1}^{n} w_{ik} \left(\frac{p_{ik}}{p_{0k}} \right)^{-1} \right)^{-1} \quad 4.3$$

where w_{ik} is the average budget share of item *k* in the primary sampling unit *i*;

p_{ik} is the median price of item *k* in the primary sampling unit *i*;

p_{0k} is the national median price of item *k*.

The Paasche price index using equation 4.3 is constructed at the level of primary sampling unit (PSU) compared to the household level. According to the World Bank (2002), this is a preferable method because it helps avoid the effect of outliers in some households and also of cases in which household consumes most of its budget by eating outside. Furthermore, the price ratio is constructed using median prices, this according to Deaton and Tarozzi (2000), preferable to using average prices because they avoid the effect of outliers.

Additionally, some extra qualifications are required to understand how equation 4.3 is estimated. Although, estimating w_{ik} (i.e. is the budget share of item *k* in the PSU *i*), is fairly straight forward from survey data but the calculation of price ratio is not. According to Deaton and Grosh (2000), LSMS and other surveys contain three possible sources of prices: (a) survey itself, since household survey in many cases report both quantities and expenditures for most food items. Thus, we can estimate *unit values* i.e. dividing expenditures by quantities; (b) prices collected along with the

household survey) and; (c) other official sources for price data such as Government price surveys.

For our estimation, price ratio in equation 4.3, is estimated using unit value (i.e. dividing expenditure by quantities) for food items from survey data which is a widely acceptable and followed method[82]. However, it is important to keep in mind that unit value is not the same as 'actual prices', without adjustment for quality differences in purchases across household and measurement error correction (Deaton, 1997). However, spatial variation of unit value has been found to be closely related to the actual price variation especially when averaged over households in a cluster/PSU (Deaton and Zaidi, 2002).

Additionally, it must be mentioned that Paasche index is calculated from unit values for food items only. Thus, this procedure makes an implicit and simplifying assumption that the household cost of living is exactly proportional to standard of living, it is adequate in the presence of unavailability of information on quantities for non-food items (World Bank, 2002).

Finally, we calculate Paasche price index at primary sampling unit (PSU) level in order to remove price differences between urban and rural areas and between provinces. These indexes are given in Table 4.4.

[82] Additionally, other price sources mentioned above were of limited or no use. For instance price data from community questionnaire was not available for Pakistan. And using price data from government price survey according to Deaton and Zaidi (2002; 40), should be a last resort because such data is often thin on ground and for many households the nearest observed price is so far away that it is irrelevant.

Table 4.4: Paasche Price Index at Primary Sampling Unit (PSU) level		
	2001-02	**1990-91**
Regions		
Urban	1.15	1.00
Rural	1.00	0.92
Provinces		
Punjab	1.03	0.90
Sindh	1.10	0.97
NWFP	1.15	0.97
Balochistan	1.16	1.05
Source: Author's own calculation using HIES (1990-91) and (2001-02)		

4.2.4.4 Inflation adjustment between Surveys

Given we are also comparing two surveys over time we need to make some adjustment in need to ensure that the welfare comparison between two periods are not driven as a result of inflation. We use consumer price index (CPI) to infer how much prices have changed between the two surveys and adjust our estimates accordingly.

4.2.4.5 Total Sample Size

FBS ensures the overall quality of HIES data by providing researcher with "clean data set" i.e. pre-checked for consistency, elimination of gross outliers and coding errors. As a result, almost all studies (mentioned earlier) have opted to work with the full

sample[83]. However, nine households were removed from HIES (2001-02) sample since there was no reported expenditure on any fortnightly items which is the most basic category dealing with food necessities.

4.3 Household Expenditure Analysis (1990-91 & 2001-02) [84]

4.3.1 National Expenditure Comparison[85]

Table 4.5 and Figure 4.1 present estimates for household welfare (measured in terms of annualized total household per capita expenditure as discussed in the previous chapter) at national level. Perhaps a relevant point before embarking on welfare analysis is to determine what proportion of population in both years can be designated as 'poor'. It appears in 1990-91 almost thirty percent of national population was below the official poverty line[86] and consequently can be termed as the *poor,* while the incidence of poverty for Pakistan significantly increased over the decade of 1990s as by 2001-02 almost 40 percent of the total national population was below the official poverty line.

This is in line with the national poverty trends during the decade of 1990 for Pakistan. For instance, Jafri (1999) and World Bank (2004) estimate head count poverty ratio for Pakistan for 1990-91 to be 27 percent and 34 percent respectively while for 2000-01, World Bank (2004), DFID (2003) and CRPRID (2003) estimate head count

[83] Only exception is Cheema (2005), who provides official poverty line estimates for Pakistan. After carrying out minute and careful analysis of HIES (2001-02) data set, this study removed only 16 households or 0.1 percent of sample size.
[84] 'Expenditure' or 'consumption' referred to anywhere in the chapter refers to household annual per capita (pc) expenditures unless mentioned otherwise.
[85] Deciles here are based on household ranking in terms of annual pc expenditures.
[86] The Government of Pakistan official poverty line estimates for (2000-01) is PRs. 725 per month. This line (adjusted for inflation rate) is used in this study to identify households falling below poverty line for (1990-91) and (2001-02).

poverty ratio for Pakistan to be 37 percent, 34 percent and 38.5 percent respectively. According to World Bank (2002) growth and consumption poverty appear to be strongly linked. For instance according to the same source, between (1990-94) the average annual per capita GDP growth was around 2 percent while poverty declined by 5 percentage point. In contrast, during (1993-99) when per capita GDP grew only at an average annual rate of 1.4 percent, poverty increased by 4 percentage point. Furthermore the largest increase in poverty took place between (1996-99), when per capita GDP grew at a rate of less than 1 percent. However, slow per capita GDP growth was not the only reason for increase in poverty in Pakistan during the 1990s. For instance, according to World Bank (2002) skewed pattern of landownership, poor access to education and health facilities, lack of critical infrastructure and restrictive social grouping, all exacerbated poverty during this period.

If we look at household welfare, during 1990-91[87] it is estimated that Pakistani household on average (at per capita and annual level) was consuming around PRs[88]. 13,140 while the average consumption of the poorest and the richest ten percent of population was PRs. 5,243 and PRs. 37,628 respectively. By 2001-02 it appears that a Pakistani household on average was consuming (at per capita and annual level) around PRs. 11,218 while the poorest and richest ten percent of population during this year were consuming PRs. 4,367 and PRs. 32,782 respectively.

A quick look at household welfare comparison over time reveals that household welfare in 2001-02 relative to 1990-91 at national level (for instance see Figure 4.1) fell across all segments of population![89] It appears a Pakistani household at national level on average experienced almost 16 percent decline in welfare compared to 1990-91 level. Furthermore, estimates reveal that over time the highest decline in welfare in 2001-02 relative to 1990-91 was experienced by the poorest segment of the

[87] All 1990-91 estimates are presented in 2001-02 prices.
[88] PRs.: Pakistan rupee.
[89] 'Welfare' is being measured in terms of household total annualized per capita consumption. Please see Chapter 3; Data Issues and Methodology for a detailed discussion.

population which experienced an almost 20 percent decline in welfare compared to 15 percent decline experienced by the richest segment of population.

Figure 4.5: Welfare Comparison (1990-2001)

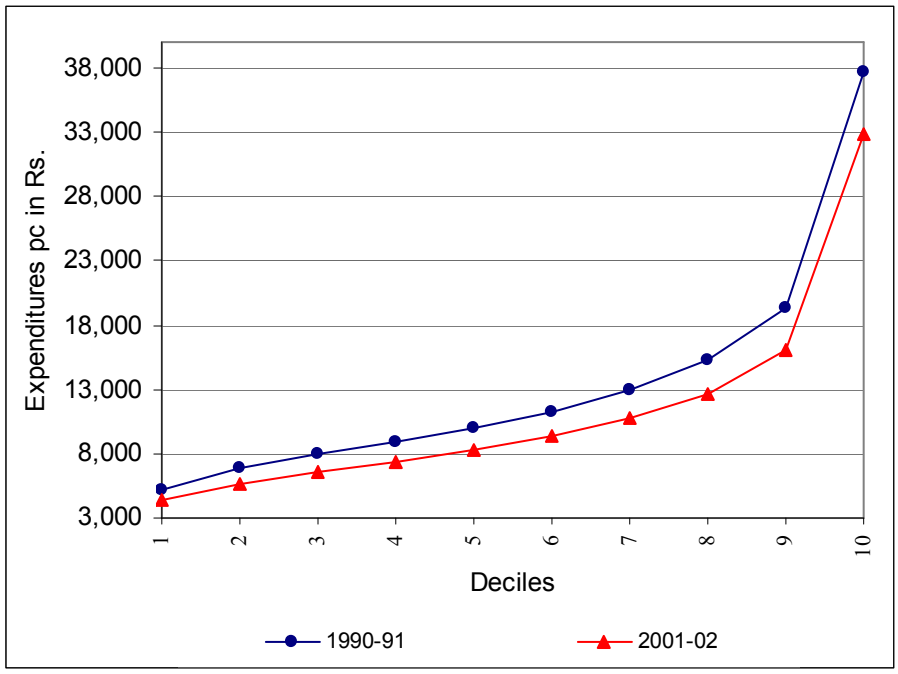

Table 5.5 : Household Expenditure Comparison (1990-91) & (2001-02)

Deciles	1	2	3	4	5	6	7	8	9	10	Avg
(2001-02)											
Pakistan											
Total Exp. 1/	4,367	5,676	6,535	7,375	8,273	9,345	10,698	12,654	16,123	32,782	**11,218**
Paid Exp. (%) /4	78	80	79	79	80	80	81	80	83	87	81
Regions											
Urban											
Total Exp. 1/	4,521	6,015	7,170	8,356	9,584	11,001	13,036	16,094	21,958	50,201	**14,832**
Paid Exp. (%) /4	91	93	94	94	94	94	94	95	95	95	94
Rural											
Total Exp. 1/	4,288	5,526	6,302	7,021	7,764	8,595	9,671	11,166	13,582	21,877	**9,718**
Paid Exp. (%) /4	**74**	76	76	76	75	75	74	74	74	75	75
(1990-91) /3											
Pakistan											
Total Exp. 1/	5,243	6,841	7,964	8,949	10,061	11,289	12,950	15,234	19,372	37,628	**13,140**
Paid Exp. (%) /4	85	84	83	83	83	84	84	84	84	88	84
Regions											
Urban											
Total Exp. 1/	5,424	7,166	8,356	9,452	10,711	12,265	14,306	17,355	23,663	51,238	**15,543**
Paid Exp. (%) /4	96	96	96	95	97	96	96	96	95	95	96
Rural											
Total Exp. 1/	5,148	6,646	7,726	8,637	9,626	10,750	12,121	14,032	17,203	29,908	**12,071**
Paid Exp. (%) /4	83	81	79	78	78	78	78	78	77	81	79

Source: Authors own calculation using HIES (2001-02) & (1990-91)

Note:1/ Total household expenditure are annualized and per capita expenditures. 2/ shaded region represents households below poverty line for that year. 3/ 1990-91 estimates are presented in 2001-02 prices. 4/ Paid per capita expenditure shares are percentage of total per capita expenditure (excluding housing expenditures from both estimates).

Table 4.5 also presents the share of market and non-market[90] transactions within total household expenditures. This estimate is very important given it is the transaction carried out in the formal market that are consequently taxable. It appears in 1990-91 the share of informal market transactions (as percentage of total household expenditure) for an average Pakistani household was around 16 percent; by 2001-02 this had increased to 19 percent. It appears in 1990-91 the poorest ten percent of households on average carried out 15 percent of their total household transactions in the informal market, this significantly increased to 22 percent by 2001-02. In comparison in 1990-91 the richest ten percent of population carried out 12 percent of transactions in the informal market. This, however, more or less remained at the same level over time. Thus it appears over time there was a significant increase in the share of informal expenditure for the poorest segment of population but same is not true for the most affluent segment of population. Although it is difficult to gauge why this has happened, one possible contributing factor could be GST broad-basing over time.

4.3.2 Rural and Urban Expenditure Comparison

Table 4.5 also presents welfare estimates for rural/urban households over time. It appears in 1990-91 a urban household on average (in terms of annual per capita expenditure) was consuming around PRs. 15,543 while in comparison household in the rural areas on average was consuming PRs. 12,071[91]. This meant rural households on average were consuming 33 percent less than their urban counterparts. In 1990-91 almost thirty percent of urban population and forty percent of rural population was below the poverty line for that year[92].

[90] 'Non-market' here implies to household consumption made possible through barter exchange, gift or assistance.
[91] Urban deciles here are based on urban household ranking in terms of annual per capita expenditures while rural deciles are based on rural households ranking in terms of annual per capita expenditures.
[92] This is supported by urban and rural poverty estimates for Pakistan. For instance, the urban poverty estimates place incidence of urban poverty at the beginning of 1990s to be around 20 percent (for

In 1990-91 the poorest ten percent of households in the rural and urban area on average were consuming PRs. 5,148 and PRs. 5,424 respectively while the richest ten percent households in rural and urban area respectively were consuming around PRs. 29,908 and PRs. 51,238 respectively. According to these estimates there was a clear welfare gap existing between the poorest and the richest segment of population. For example, in rural areas the poorest decile households' proportionate consumption was only 18 percent of the richest decile in the same region. This was even worse for urban areas at 11 percent only.

Another interesting piece of information is to compare welfare levels of the same decile households in the urban and rural areas which gives an idea of how well similar segments of population are doing when compared against each other. By doing this we find poor to middle decile households in urban/rural areas fairing better when compared to each other (as compared to how the affluent decile households were doing). For instance, rural poorest ten percent of population in terms of their urban counterparts was almost 94 percent; this fell to 89 percent for the middle decile households but to only 58 percent for the most affluent decile.

In 2001-02, a rural and urban household on average was consuming (per annum per capita basis) around PRs. 9,718 and PRs. 14,832 respectively. During the same time the poorest ten percent of population in the rural and the urban areas was consuming PRs. 4,288 and PRs. 4,521 respectively while the richest ten percent of population in the rural and the urban area was consuming PRs. 21,877 and PRs. 50,201 respectively. We can see from the shaded region in Table 5.1 that in 2001-02 almost 30 percent of urban and forty percent of rural population was below the official poverty line or 'poor'.

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instance see Amjad and Kemal, 1997 and Ali and Tahir, 1999) and 22-25 percent for the end of 1990s (see for instance FBS ,2001; and World Bank, 2002). Similarly, rural poverty incidence at the beginning of 1990s is estimated to be around 19-26 percent (see for example Amjad and Kemal, 1997; Ali and Tahir, 1999; and Jafri, 1999) while that for end of 1990's is estimated to be around 35-40 percent (see for example FBS, 2001; World Bank, 2002; Arif et al, 2001).

During this time, the poorest ten percent of population in the rural area was enjoying only 20 percent of consumption level being enjoyed by the richest ten percent of population in this region. However, situation was much worse in the urban areas where the urban poorest ten percent of population enjoyed only 9% of consumption level being enjoyed by their richest counterparts. Thus, it appears that although this gap had slightly decreased for the rural population but increased for the urban population.

If we compare same segments of population in both regions, we find trends similar to that for 1990-91. For instance, the rural poorest ten percent proportionate consumption in terms of same segment of population in the urban areas was around 95 percent (almost the same level as in 1990-91). This, however, fell to 78 percent for the fifth decile households (compared to 89 percent in 1990-91) and to only 65 percent (against 58 percent for 1990-91) for the richest ten percent households. Thus, it appeared that in 2001-02 middle decile households in the rural areas fell further behind their urban counterparts compared to 1990-91.

Table 4.5 also presents the share of market and non-market transactions carried out by the rural and the urban areas over time. In 1990-91, 96 percent of the total transactions of an average urban household were carried out in the formal market compared to 79 percent by the rural households. By 2001-02, little had changed for the urban areas as an urban household on average still carried out 94 percent of total transactions in the formal market compared to 75 percent for the rural area.

However, this difference was more apparent for the poorest and richest ten percent of population in the urban/rural areas. For instance, in 1990-91 the poorest ten percent of households in the urban (rural) areas carried out 96 (83) percent of total transactions in the formal market while by 2001-02 this changed to 91 (74) percent respectively. Similarly the richest ten percent of population in the urban (rural) areas in 1990-91

were carrying 95 (81) percent of total transactions in the formal market but by 2001-02 this changed to 95 (and only 75) percent. Thus, although share of formal market transactions in the urban areas did not change much, things changed considerably for the rural areas.

4.4 Selected Commodity Expenditure Analysis (1990 – 91) & (2001 – 02)

This section will briefly look at the main expenditure categories emerging from the HIES (1990-91) and (2001-02) survey. This will enable us to look at household expenditure patterns at a disaggregated level and allow us to characterize various expenditure patterns as necessities or luxuries based on the overall population expenditure patterns. This information is important because this analysis will not only help us identify categories that are more important for the poor, but this information will come handy when attempting to disaggregate the GST incidence picture in the later section.

If we look at Table 4.6 we can see household disaggregated expenditure patterns at national level both for (1990-91) and (2001-02) [please see Appendix 4.3 for disaggregated expenditure patterns for the urban and the rural areas]. If we look at Table 4.6 we can see that in 1990-91 the most important expenditure category for a Pakistani household on average was *food items* on which households on average were spending around 53 percent of total household expenditure. The second important expenditure category for households on average appeared to be *housing* expenditures (15 percent), this was followed by *clothing items* (8.5 percent), *fuels/utilities* (6.0 percent), *transport and travelling group* (4.0 percent), *health* (3.1 percent), *tobacco* (2.2 percent), *education* (1.7 percent), and *durable expenses* (0.52 percent). It is quite important to note that three particular food items namely milk, sugar and cereals individually were as significant (in terms of expenditure shares) for households as

many other non-food expenditure items as households on average were spending 10.8 percent on milk, 10.1 percent on cereals, and 4.8 percent on edible oils.

Another interesting piece of information is the general trend of these expenditure categories. For instance, we find expenditure on *food*, *clothing* and (surprisingly) *fuel /utilities* as a percentage of total household expenditure decrease as households become affluent, thus these appear to be necessities. On the other hand, proportionate expenditures (as a proportion of total household expenditure) on *transport and travel* group, *education*, and *housing* increase as population becomes more affluent. As a result these appear to be luxuries. However, expenditure share on *Tobacco* group appears to be inverted U-shaped (it is relatively more important for the middle classes compared to the tails). Lastly, it was not possible to make any clear cut expenditure pattern across population on *health* and *durable* goods.

If we look at Table 4.6 we can also see significant differences in expenditure shares on important expenditure categories for the poorest ten percent and the richest ten percent of population. For instance, in 1990-91 if we rank top three important categories for the poorest ten percent of population, these are food expenditures (61 percent), clothing (9.5 percent) and housing (9.2 percent), while the top three expenditure categories for the richest ten percent of population are also food expenditures (40 percent), housing (21 percent), and transport and travel group (8.08 percent). Thus, even though the top two expenditure categories are the same across both segments of population the poor are spending almost fifty percent more on the food items while the richest ten percent of the population is spending almost double on housing expenses.

By 2001-02, *food* expenditure still remained as the most important expenditure category with a Pakistani household on average spending around 48 percent of total household expenditure on food. This is followed by h*ousing* which retains its position as the second most important expenditure category (on which households on average

are spending around 13 percent of total household expenditure). This is followed by *fuels/utilities* (8 percent), *clothing* (7 percent), *education* and *travel group* (both around 4 percent), *health* (2 percent), *tobacco* (1.6 percent) and *durable* items (1.4 percent).

If we look at the overall trend of expenditures across population on these commodities, as earlier, categories such as *education, housing, travelling* group and additionally *durable* items appeared to be luxuries (as expenditures on these categories as a percentage of total household expenditure increases as household become affluent) while expenditure on *food*, *fuels/utilities* and *clothing* still appear to be necessities (as expenditures on these categories as a percentage of total household expenditure fall as household become affluent). Surprisingly now *tobacco* also appears to be a necessity!

In addition to this if we look at the average level of expenditures over time we find that the average expenditure on a *food* category has slightly fallen from 53 percent in 1990-91 to 48 percent in 2001-02. It appears overtime average expenditure on major food items like milk has slightly declined, but increased for sugar and cereals. Among non-food expenditure categories, average expenditure shares on clothing, travelling, house rent, tobacco and health have slightly declined, while expenditure on durable items, fuels/utilities and education has slightly increased over time.

Table 6.6 : Household Expenditure (as % age of total expenditure)

Deciles	Total Food Exp	*Milk*	*Sugar*	Cereals	*Wheat*	*Rice*	Edible oils	*Veg. Ghee*	Tobacco	Fuels	*Kerosene*	*Electricity*	Travel Group	*Public Transport*	Clothing	Education	House Rent	Health	Durable Exp
									(1990 - 91)										
1	61.3	*10.5*	*4.5*	17.5	*14.6*	*2.4*	6.1	*5.4*	2.01	7.2	*0.70*	*1.5*	1.83	*1.60*	9.5	0.94	9.2	3.3	0.61
2	59.7	*11.0*	*4.6*	15.1	*12.2*	*2.4*	5.7	*4.9*	2.23	7.2	*0.76*	*1.6*	2.41	*2.22*	9.6	0.98	9.8	2.8	0.42
3	58.7	*11.9*	*4.2*	14.0	*10.9*	*2.7*	5.5	*4.5*	2.12	6.7	*0.76*	*1.7*	2.44	*2.19*	9.5	1.08	11.4	2.9	0.47
4	57.7	*11.4*	*4.1*	12.8	*10.0*	*2.2*	5.3	*4.2*	2.37	6.5	*0.76*	*1.7*	2.40	*2.10*	9.1	1.42	12.0	3.0	0.47
5	57.1	*11.8*	*4.0*	11.8	*8.9*	*2.3*	5.5	*4.3*	2.43	6.7	*0.87*	*1.7*	2.76	*2.41*	8.9	1.22	12.2	3.0	0.38
6	55.1	*11.5*	*3.8*	10.9	*8.3*	*2.1*	5.0	*3.8*	2.36	6.4	*0.84*	*1.8*	3.15	*2.71*	8.7	1.41	13.2	3.5	0.47
7	54.4	*11.8*	*3.3*	9.8	*7.3*	*2.1*	4.9	*3.4*	2.44	6.0	*0.92*	*1.7*	3.36	*2.61*	8.7	1.34	14.4	3.3	0.37
8	53.8	*11.9*	*3.1*	9.0	*6.7*	*1.9*	4.8	*3.1*	2.39	6.0	*0.92*	*1.8*	3.42	*2.51*	8.4	1.61	15.1	3.5	0.45
9	50.2	*10.5*	*2.8*	7.5	*5.5*	*1.6*	4.6	*2.8*	2.13	5.8	*0.74*	*1.7*	4.45	*2.71*	8.3	1.69	16.8	3.6	0.49
10	39.9	*8.0*	*1.7*	4.3	*2.7*	*1.3*	2.9	*1.3*	2.07	4.0	*0.31*	*1.9*	8.08	*1.93*	6.6	3.15	21.4	2.5	0.53
Total	**52.9**	***10.8***	***3.3***	**10.1**	***7.7***	***2.0***	**4.8**	***3.4***	**2.25**	**6.0**	***0.73***	***1.8***	**3.96**	***2.32***	**8.5**	**1.67**	**14.6**	**3.1**	**0.52**
									(2001 - 02)										
1	57.4	*8.2*	*4.5*	20.8	*17.2*	*3.4*	6.1	*5.8*	2.21	9.3	*0.38*	*3.2*	2.04	*1.86*	8.6	1.63	8.0	1.8	0.49
2	56.7	*8.9*	*4.7*	18.2	*14.4*	*3.6*	5.7	*5.3*	2.13	9.1	*0.47*	*3.4*	2.40	*2.63*	8.2	2.06	8.2	1.9	0.62
3	56.0	*9.4*	*4.6*	16.6	*12.9*	*3.4*	5.7	*4.9*	2.08	9.1	*0.41*	*3.7*	2.65	*3.22*	8.1	2.34	8.2	2.1	0.72
4	54.9	*9.7*	*4.4*	15.0	*11.8*	*2.8*	5.4	*4.6*	1.87	8.8	*0.41*	*3.5*	2.86	*3.44*	8.2	2.67	9.1	2.0	0.88
5	53.3	*9.7*	*4.3*	13.8	*10.6*	*2.9*	5.4	*4.3*	1.95	8.8	*0.38*	*3.7*	3.32	*4.13*	7.9	2.71	9.9	2.0	0.93
6	51.9	*10.0*	*4.0*	12.5	*9.6*	*2.6*	5.2	*4.0*	1.83	8.7	*0.39*	*3.8*	3.28	*4.41*	7.6	3.22	11.4	1.9	1.15
7	50.5	*10.0*	*3.6*	11.0	*8.4*	*2.3*	5.1	*3.7*	1.80	8.6	*0.35*	*4.0*	3.82	*4.88*	7.4	3.13	12.0	1.8	1.32
8	48.6	*10.2*	*3.2*	9.7	*7.3*	*2.2*	4.8	*3.2*	1.47	8.2	*0.32*	*3.9*	4.13	*5.58*	6.9	3.78	13.2	2.0	1.61
9	43.8	*9.5*	*2.6*	7.4	*5.6*	*1.6*	4.4	*2.6*	1.40	8.1	*0.27*	*4.4*	4.94	*6.31*	6.8	4.42	15.1	2.0	2.07
10	32.5	*6.5*	*1.5*	3.9	*2.7*	*1.0*	2.7	*1.2*	0.80	6.9	*0.27*	*4.4*	5.48	*6.95*	4.9	6.13	22.1	1.8	2.36
Total	**47.8**	***9.0***	***3.4***	**11.1**	***8.6***	***2.3***	**4.7**	***3.5***	**1.60**	**8.3**	***0.35***	***3.9***	**3.87**	***4.33***	**7.1**	**3.68**	**13.3**	**1.9**	**1.43**

Source: Authors own calculation using HIES (1990-91) & (2001-02)

4.5 Conclusion

This study will use the HIES (1990-91) and (2001-02) survey for carrying out partial equilibrium indirect tax incidence analysis of Pakistan. This chapter has tried to present an overview of the underlying data source, its methodology, data collection procedures along with household welfare estimates for 1990-91 and 2001-02. We have tried to show in this chapter that HIES survey is a carefully collected survey; it provides very relevant information to what is needed in this study and it is a good quality household cross section survey which has been utilised intensively over time for Pakistan.

Thus, in the following chapters we are in a position of carrying out the main empirical analysis of this study. In next chapter we move to determining the social incidence of GST/VAT in Pakistan while using (1990-91) and (2001-02) HIES survey.

CHAPTER V: Social Incidence of General Sales Tax (GST) in Pakistan (1990-91) & (2001-02)

5 Introduction

This chapter attempts to measure the social incidence of GST in Pakistan in the pre- and post- reform era. We start with GST/VAT incidence because GST/VAT reforms were at the centre stage of the reform process embarked by Pakistan in the 1990s, and by the end of the reform process GST/VAT revenues emerged as *the* most significant component of Pakistan's federal tax structure. Thus, any serious attempt at estimating indirect tax incidence must start with the GST/VAT incidence, which this chapter intends to do.

Furthermore, this chapter also aims to present GST/VAT incidence picture at disaggregated level. The intention is to clearly show how the underlying GST/VAT incidence at pre- and post- reform era for the national as well as the urban/rural areas is being generated. We believe such discussion is important not only for understanding the elements that may make the overall GST/VAT incidence pattern progressive/regressive/proportional but also for isolating effects that may be distributively more important for the poor. Furthermore, the last section of this chapter also focuses on the explicit issue of GST/VAT exemptions. We believe this is fundamentally an important issue for safeguarding the poor from GST/VAT net by maintaining well-targeted exemptions.

This Chapter is divided into four main sections. The first section begins with the main aim of this chapter that is determining the GST/VAT social incidence at pre- and post-

reform time for national as well as for the urban/rural areas. The second section presents the disaggregated view of GST incidence over time at national level as well as for the urban/rural areas. The third section of this chapter moves to address the question of GST/VAT exemptions. We use distributional characteristics of a good approach to show expenditure items in HIES (2001-02) that are proportionally more important for the poor, and use this information to evaluate current and propose future GST/VAT exemptions to safeguard the poor. The fourth section concludes.

5.1 GST Incidence

5.1.1 Description of GST

As mentioned in Chapter two in detail, GST in VAT mode was introduced in Pakistan by the Sales Tax Act of 1990. Initially it was levied at the import and manufacturing stage only at a rate of 12.5 percent. During the initial years the revenue impact of GST was almost negligible because the GST regime was riddled with standard, geographical and development exemptions. It was not until late 1990s when GST structure came close to the true spirit of VAT; with its extension to the retail sector, elimination of most of exemptions, and introduction of a single rate at 15 percent[93]. These summary differences are presented in Table 5.1.

[93] This discussion has been kept brief purposely since most of these issues have been covered in detail in Chapter 2; Taxation in Pakistan (1985-2001).

Table 5.1: Summary of General Sales Tax evolution overtime

(1990-91)		(2001 – 02)	
Goods	**Services**	**Goods**	**Services**
All goods GST taxable @ 12.5 percent except those mentioned below:		All goods GST taxable @ 15.0 percent except those mentioned below:	
Exempt Goods:	*Exempt* Services:	*Exempt* Goods:	*Exempt* Services / 2:
1. Live animal, meat and fish 2. fresh milk 3. vegetable, fruits and nuts 4. cereals 5. pulses 6. edible oils: desi ghee, vegetable ghee, cooking oils & other oils & fats 7. salt and spices 8. butter, cream, cheese and eggs 9. curd, yogurt, honey & gur 10. tea 11. pickle chatni, yeast and ice 12. fuels 13. tobacco & tobacco products 14. second hand clothing and footwear 15. books and stationary for educational purpose. 16. milled products 17. pharmaceutical products 18. durables: air conditioner, air cooler and fans (ceiling, table and pedestal), cooking stove (electric, gas or kerosene), bicycle, sewing machine, personal computers 19. hides and skins 20. cotton & wool 21. fertilizer 22. equipment of national defense	1. Hair saloons and beauty parlors 2. dry cleaning and laundry 3. hotels, catering and clubs 4. advertising 5. photography 6. auditing and engineering 7. consultation 8. cinema 9. commission agents 10. tourism 11. hire of goods 12. air travel 13. train travel 14. financial services 15. real estate and construction 16. educational services 17. water 18. electricity 19. Gas (pipe and cylinder)	1. Live animal, meat and fish 2. fresh milk 3. butter, cream, cheese and eggs 4. cereal 5. pulses 6. edible oils: desi ghee 7. salt and spice /1 8. butter, cream, cheese and eggs /1 9. curd & yogurt /1 10. ice 11. fuels: dung cake and agriculture waste 12. tobacco: tobacco raw, pan leaves and betel nut 13. wool and cotton 14. second hand clothing and footwear 15. books and stationary for education purpose 16. milled products 17. pharmaceutical products 18. durables: personal computers and sewing machine 19. hides and skins 20. equipment of national defense	1. photography 2. audit and engineering 3. commission agents 4. tourism 5. hire of goods 6. financial services 7. real estate and construction 8. education services 9. water

1/ Unless packed and sold under brand names or trade mark.
2/ The Federal Legislative list (item No.49 of the Fourth Schedule) of the Constitution provides for levy of tax on sales and purchases of goods, but not on services. The Sales tax act, 1990 is thus applicable to *supply of goods*. Services are therefore considered a Provincial subject. In case of eleven services (namely services provided by hotels, marriage halls/lawns, clubs, caterers, advertising on TV/Radio, custom agents, ship chandlers, stevedores, courier service, beauty parlor/ beauty clinics/ slimming clinics, laundries and dry cleaners) Provincial constitution has been promulgated to allow the Federal Government to collect tax on services as if it was sales tax under the federal sales tax Act of 1990.

5.1.2 Estimation of GST/VAT amounts[94]

Since GST/VAT can be charged from market transactions only, the starting point of this calculation is HIES reported paid or formal market transactions. The tax information is provided by the Central Board of Revenue, Pakistan which is used to identify taxable items from the HIES survey for each year. Once a good/ service is identified as taxable, the statutory GST/VAT rate is used to calculate the taxable liability.

We use the same formula used by Cho et al., (2003), Sahn and Younger (2003), and Edmiston and Bird (2006) (to name but a few) to determine the tax paid on each item:

$$T_{i,j} = \frac{t_j}{1+t_j} e_{i,j} \qquad 5.1$$

Where

$T_{i,j}$ = household i "s per capita VAT/GST payment on good j

t_j = statutory VAT/GST rate

$e_{i,j}$ = observed expenses or post tax per capita expenditures on good j

Equation 5.1 is used to determine amount of taxes paid on each item, (on per capita basis) for each household for a span of a year. However, we present results on the basis of *deciles*. Households ranking in deciles are based on ascending order of

[94] Given that household welfare estimates for 1990-91 and 2001-02 have already been discussed in detail in Chapter 4, this section only focuses on how that information is used to calculate GST liabilities and incidence.

annualized per capita household total expenditures, also a proxy of household welfare (for instance see Chapter four). This enables us to determine average tax payments per decile at annual level. The incidence or the effective GST/VAT rate per decile is determined by dividing this by the average total household annual per capita expenditure (paid & un-paid) per decile.

5.1.3 Progressivity, Regressivity or Proportionality of tax

This study uses average progressivity rate (APR) to judge progressivity, regressivity or proportionality of an underlying tax/tax system. As already discussed above (and in chapter 4) that this study uses household total expenditure (per capita) as a measure of household welfare and this measure is used to rank households in decile in ascending order; from poorest (1^{st}) decile to richest (10^{th}) decile. Thus, when effective tax rate per decile (i.e. average per capita tax liability as a percentage of average per capita total household expenditures for each decile) rises as we move up the deciles; the tax/tax system will be considered *progressive*; it is *regressive* if effective tax rate falls as we move up the deciles and *proportional* when effective tax rates remain constant[95].

5.1.4 National GST Incidence

Results for GST incidence at the national level for (1990-91) and (2001-02) are presented in Table 5.2. If we look at Table 5.2 and the GST incidence figures for (1990-91) two things are quite obvious. (a) GST incidence for (1990-91) appears to be

[95] This may not be the only definition of progressivity/regressivity; for other definitions/measures see Chapter 3. However, this definition is considered adequate for this analysis.

clearly progressive. (b) The magnitude of incidence is quite small. For instance, the average GST/VAT tax incidence in (1990-91) was around 1.30 percent while for the poorest and richest ten percent population of Pakistan it was only 1.08 and 1.52 percent respectively. However, this should not be a surprise given information in Table 5.1 and discussion in the earlier chapter, chapter two.

Table 5.2 also presents GST/VAT incidence for (2001-02) which in other words also shows the impact of tax reform process and shows GST incidence at post- reform time. Looking at (2001-02) results makes two things apparent. (a) The magnitude of GST/VAT in (2001-02) is quite different from GST/VAT incidence at pre-reform era. (b) Despite exemptions of basic food items, GST/VAT incidence appears to be at best proportional over majority of the population. Our results show that the average GST/VAT incidence in 2001-02 for a Pakistani household was 4.7 percent, whereas it was 4.58 percent for the bottom ten percent of the population and only 4.65 percent for the richest ten percent of the population!

Table 5.2: Household per capita annual expenditure and GST Incidence (1990-2001)

Deciles	Household Total Exp.	Paid Exp.	GST Payable	GST Incidence
(2001 - 02)				
1	4,367	3,364	205	4.58
2	5,676	4,487	275	4.73
3	6,535	5,100	314	4.70
4	7,375	5,753	355	4.70
5	8,273	6,432	399	4.71
6	9,345	7,282	450	4.68
7	10,698	8,386	518	4.69
8	12,654	9,746	600	4.58
9	16,123	12,529	786	4.70
10	32,782	26,467	1,632	4.65
Avg	**11,218**	**8,817**	**545**	**4.67**
(1990-91)				
1	5,243	3,984	55	1.08
2	6,841	5,116	82	1.25
3	7,964	5,803	96	1.25
4	8,949	6,522	110	1.28
5	10,061	7,330	126	1.30
6	11,289	8,228	142	1.31
7	12,950	9,404	168	1.34
8	15,234	10,883	198	1.35
9	19,372	13,752	258	1.39
10	37,628	27,705	548	1.52
Avg	**13,140**	**9,568**	**172**	**1.30**

Source: Authors own calculation using HIES (1990-91) & (2001-02).

Note 1/ Shaded region represents households below poverty line for that year.

2/ All Expenditures are in reported in (2001-02) prices.

Another interesting aspect is to look at the percentage increase in tax liabilities over time. On average the GST tax liabilities over time increased by 72 percent for an average Pakistani household. The greatest increase in GST tax liabilities was experienced by the poorest segment of the population which experienced a 76 percent increase in GST liabilities after reform compared to a 67 percent increase experienced by the richest ten percent of national population. Interestingly, even the middle income deciles experienced a higher increase in GST liabilities over the period i.e. 1990-2001 compared with what was experienced by the top thirty percent of population.

One plausible explanation of this (other than changing expenditure patterns overtime) could be that during the reform process the pattern of GST/VAT broad-basing has affected the poor households more than the rich. For instance, if we look at Table 5.3 we get some feel of how GST broad basing over time has affected different segments of population over time. In 1990-91, 84 percent of the total goods/services consumed by a Pakistani household on average were GST/VAT exempt. Furthermore, almost 87 percent of total goods/services consumed by a Pakistani household on average were exempted; this fell to 84 percent for the middle decile households and to 82 percent for the richest ten percent of population. Thus, the pattern of GST/VAT exemption at pre- reform era appear to benefit the relatively poor segments of populations more and could be one of the reasons behind GST/VAT progressivity in 1990-91.

By 2001-02 due to the removal of GST/VAT exemptions or GST/VAT broad basing, GST/VAT exemption shares for an average Pakistani household fell from 88 percent to only 52 percent! Additionally, compared to the pre-reform era, it appears that the pattern of GST/VAT exemptions is benefiting all segments of population almost equally (this issue in detail is discussed in the last section of this chapter). Thus, this is also one of the reasons (other than changes in expenditure patterns overtime) responsible for almost proportional GST/VAT incidence in 2001-02.

Table 5.3: Share of Exempt goods and services

Deciles	National	Urban	Rural	National	Urban	Rural
	(2001 - 02)			(1990-91)		
1	52.62	55.60	51.31	87.44	88.64	87.35
2	52.89	56.02	51.65	85.19	87.30	84.79
3	52.58	55.84	51.43	84.82	86.23	84.13
4	52.22	55.01	50.81	84.47	86.01	83.60
5	51.97	55.31	50.96	84.18	85.79	83.72
6	52.24	54.67	50.88	84.22	84.86	83.79
7	51.96	55.31	49.97	83.70	84.73	83.48
8	52.16	53.09	50.61	83.18	84.45	82.83
9	51.12	53.19	49.58	82.71	84.39	81.37
10	51.29	52.12	48.71	81.76	83.00	80.99
Total	**52.11**	**54.62**	**50.59**	**84.22**	**85.49**	**83.66**

Source: Authors own calculation using HIES (1990-91) & (2001-02)

Note: 1/ Shares here are calculated as a % age of household total paid (or formal market) expenditures.

2/ Shaded area represents households below the poverty line for that year.

5.1.5 GST Incidence: Urban and Rural Areas

GST regional (i.e. the urban and the rural) incidence is presented in Table 5.4. The average GST incidence in (1990-91) for a household in urban area on average was 1.32 percent while that for the rural area it was 1.29 percent. Thus, it appears in (1990-91) the level of average GST/VAT incidence faced in both regions was quite similar as rural areas on average paid only 1 percent less GST/VAT than their urban counterparts. The GST/VAT pre-reform incidence for the poorest ten percent of population in the rural and the urban areas was 1.06 and 1.09 percent respectively and that for the richest ten percent of population it was 1.5 and 1.4 percent. Thus, it appears that the rural and the urban incidence trend lie very close to each other, as the overall GST/VAT incidence trend in the urban areas (except for sixth and ninth decile households) and for rural areas (except for fourth decile households) can be termed as progressive.

If we look at the average GST/VAT incidence in 2001-02 i.e. the post reform era for the rural and urban households, it averaged around 4.62 percent for the rural areas compared with 4.80 percent for the urban areas. In (2001-02) the poorest ten percent of the rural and the urban households were facing an incidence of 4.50 and 4.84 percent respectively while the richest ten percent of population in the rural and the urban areas faced an incidence of 4.66 and 4.60 percent respectively. It appears the incidence faced by the poorest ten percent of population in the rural areas was lowest GST/VAT incidence on average faced by any rural decile in the post- reform era but in the urban areas incidence faced by the poorest ten percent of population was the highest incidence faced by any decile (except the fourth and sixth decile households). As for the overall incidence trend for the regional population, it appeared to be progressive for both the urban areas (at least over the bottom six deciles) and the rural areas.

If we look at the proportionate increase in tax liabilities over time we can see that both rural/urban areas on average experienced a 72 percent increase in tax liabilities. However, the poorest ten percent of population in both the rural/urban areas experienced a 77 percent increase in tax liabilities compared to 69 and 67 percent increase in tax liabilities experienced by the urban and rural richest ten percent respectively. Thus, it appeared GST reforms on average increased the tax liabilities for the poorest segment of urban/rural population more than that for the richest segment of population.

Table 5.4: Regional Expenditure and GST Incidence (2001-02) & (1990-91)

		(2001 - 02)				(1990-91)			
	Deciles	Household Expenditure (PRs.)	Paid Exp. (PRs.)	GST Payable	GST Incidence (%)	Household Expenditure (PRs.)	Paid Exp. (PRs.)	GST Payable	GST Incidence
Urban	1	4,521	4,338	249	4.84	5,424	4,856	61	1.09
	2	6,015	5,893	334	4.90	7,166	6,318	89	1.21
	3	7,170	6,938	398	4.91	8,356	7,147	109	1.27
	4	8,356	8,001	460	4.88	9,452	8,180	126	1.30
	5	9,584	9,141	522	4.83	10,711	9,271	146	1.33
	6	11,001	10,346	603	4.85	12,265	10,394	175	1.40
	7	13,036	12,331	696	4.71	14,306	11,928	202	1.38
	8	16,094	14,585	863	4.76	17,355	14,362	248	1.40
	9	21,958	19,785	1,181	4.77	23,663	19,136	332	1.37
	10	50,201	42,432	2,553	4.59	51,238	37,786	726	1.41
	Avg	**14,832**	**13,429**	**789**	**4.80**	**15,543**	**12,657**	**215**	**1.32**
Rural	1	4,288	3,089	192	4.51	5,148	3,719	51	1.06
	2	5,526	4,098	258	4.70	6,646	4,703	77	1.24
	3	6,302	4,610	289	4.62	7,726	5,332	91	1.27
	4	7,021	5,195	328	4.68	8,637	5,872	106	1.30
	5	7,764	5,641	358	4.65	9,626	6,542	116	1.29
	6	8,595	6,185	394	4.62	10,750	7,180	128	1.27
	7	9,671	6,794	442	4.63	12,121	8,098	147	1.30
	8	11,166	7,893	502	4.56	14,032	9,253	172	1.32
	9	13,582	9,309	608	4.56	17,203	11,142	226	1.41
	10	21,877	15,295	1,005	4.66	29,908	20,780	427	1.52
	Avg	**9,718**	**6,903**	**444**	**4.62**	**12,071**	**8,193**	**153**	**1.29**

Source: Authors own calculation using HIES (2001-02) & (1990-91).

Note: shaded region represents households below poverty line for that year.

2/ Expenditures are pc and annualized and reported in (2001-02) prices.

5.2 Selected Commodity Incidence Analysis

The main reason for disaggregating GST/VAT incidence is to highlight the important facts that remain hidden when we only look at the overall incidence picture only. For instance, by disaggregating the incidence picture we can clearly see how this incidence picture is being generated and also identify taxable commodities that may be having powerful distributional impact on the poor. This we believe is a very important information as far as the Government pro-poor policy agenda is concerned.

Table 5.5 presents GST/VAT disaggregated incidence picture for 1990-91 at national as well as for the rural and the urban areas. It is perhaps no surprise to find a very few items on the list as taxation under GST at this time was quite limited (due to plethora of existing exemptions as discussed earlier). During 1990-91 the highest average GST incidence share (as a percentage of total GST incidence) for a average Pakistani household at national level came from food items (0.28 percent with almost 85 percent of this due to the taxation of sugar!). This was followed by petroleum, oil and lubricant products (POL) taxation which was responsible for (0.27 percent of total GST incidence), tobacco (0.15 percent), clothing (0.14 percent) and personal effects (0.13 percent) respectively.

As perhaps expected, the overall incidence of the food category (also sugar) and clothing items were clearly regressive. In addition to this we find that the GST incidence on POL products appears to be strongly progressive. Furthermore, GST incidence on tobacco also appears to be progressive but only for the first fifty percent of population and slightly regressive afterwards (this ties well with our discussion of selected commodities disaggregated expenditure analysis in section 4.4 of previous chapter). According to our earlier discussion based on the pattern of expenditures on

major expenditure categories (as percentage of total household expenditure); food items, clothing appeared to be necessities while POL products appeared to be a luxury item. Thus if necessities are taxed they are likely to create a negative distributional effect on the welfare of people.

The bottom part of Table 5.5 also presents the rural and the urban GST disaggregated incidence shares (i.e. as a percentage of the total GST incidence) for 1990-91. This analysis is important since it can help us figure out why average GST incidence and the overall GST trend for both the urban and the rural areas in the pre- reform era appeared to lie so close. Interestingly, the top GST incidence share for an urban household on average was coming from POL product (0.30 percent). This was followed by food items (0.25 percent share), tobacco (0.15 percent), personal effects (0.14 percent) and clothing (0.13 percent). While for rural households on average the most significant incidence share was coming from food items (0.30 percent), followed by POL products (0.25 percent), tobacco and clothing (each at 0.15 percent), and personal effect at 0.12 percent. Thus, it appeared as a result of underlying similar patterns of expenditures on these taxable items in the rural/urban areas on average, the respective incidence picture was also quite similar.

In terms of the overall GST incidence trend of these categories, in the urban areas only POL product incidence appeared to be progressive while the incidence on food items and clothing was significantly regressive. Additionally, the GST incidence on tobacco group appeared to be of inverted U-shaped showing middle classes bearing larger burden of tax compared to tails. Thus, one reason for the clear progressivity of GST incidence in the urban areas appeared to be strong progressivity of GST incidence on POL products. Furthermore, this to some extent was aided by the fact that even though GST incidence on food fell across population as households became more affluent but for the top fifty percent of population this fall in the GST incidence on food was comparatively less sharp than increase in POL incidence on the other side.

On the other side, for the rural areas, we also find GST incidence on POL products progressive but regressive for food items. Furthermore, clothing incidence appears to be regressive, while GST incidence on tobacco and personal effects to a large extent appear to be proportional. However, compared to the urban population, GST incidence on food appears to fall much slowly over deciles as population becomes affluent (because of the underlying expenditure patterns). Thus, it appears GST incidence progressivity in the rural areas appears to be largely driven by POL incidence particularly due to strong progressivity of GST incidence on POL products over the top fifty percent of population.

Table 5.5: Incidence shares (i.e. % of total GST incidence) for GST (1990-91)

		Total Food	Sugar	Tobacco	Personal Effects	POL products	*Public Tran.*	Clothing	Durables
Pakistan	1	0.36	0.34	0.14	0.12	0.16	0.16	0.19	0.00
	2	0.35	0.32	0.14	0.11	0.20	0.20	0.17	0.00
	3	0.34	0.31	0.14	0.12	0.20	0.19	0.16	0.00
	4	0.33	0.30	0.16	0.12	0.19	0.18	0.16	0.00
	5	0.31	0.28	0.17	0.12	0.21	0.20	0.15	0.00
	6	0.30	0.25	0.16	0.12	0.24	0.23	0.15	0.00
	7	0.29	0.24	0.16	0.12	0.24	0.21	0.14	0.01
	8	0.27	0.22	0.15	0.14	0.25	0.20	0.14	0.01
	9	0.25	0.20	0.13	0.13	0.28	0.21	0.13	0.01
	10	0.18	0.11	0.12	0.13	0.41	0.14	0.09	0.01
	Total	**0.28**	**0.24**	**0.15**	**0.13**	**0.27**	**0.19**	**0.14**	**0.01**
Urban	1	0.41	0.37	0.13	0.14	0.14	0.14	0.17	0.00
	2	0.34	0.31	0.16	0.14	0.18	0.17	0.16	0.00
	3	0.33	0.29	0.14	0.14	0.20	0.19	0.15	0.00
	4	0.29	0.25	0.15	0.15	0.19	0.18	0.15	0.01
	5	0.28	0.24	0.20	0.13	0.23	0.22	0.15	0.00
	6	0.27	0.22	0.16	0.12	0.28	0.23	0.13	0.00
	7	0.25	0.21	0.18	0.13	0.26	0.22	0.12	0.01
	8	0.24	0.18	0.12	0.15	0.29	0.22	0.13	0.01
	9	0.22	0.15	0.13	0.13	0.36	0.21	0.12	0.02
	10	0.15	0.07	0.10	0.13	0.45	0.11	0.08	0.01
	Total	**0.25**	**0.19**	**0.15**	**0.14**	**0.30**	**0.19**	**0.13**	**0.01**
Rural	1	0.35	0.33	0.13	0.11	0.17	0.17	0.19	0.00
	2	0.35	0.32	0.14	0.11	0.20	0.20	0.17	0.00
	3	0.34	0.31	0.14	0.11	0.20	0.19	0.16	0.00
	4	0.33	0.30	0.16	0.11	0.21	0.20	0.16	0.00
	5	0.34	0.31	0.16	0.11	0.18	0.18	0.16	0.00
	6	0.31	0.27	0.15	0.12	0.23	0.22	0.15	0.00
	7	0.31	0.26	0.14	0.12	0.22	0.20	0.15	0.00
	8	0.29	0.25	0.15	0.12	0.23	0.20	0.15	0.01
	9	0.27	0.22	0.15	0.13	0.26	0.20	0.14	0.01
	10	0.22	0.16	0.14	0.12	0.36	0.17	0.11	0.01
	Total	**0.30**	**0.26**	**0.15**	**0.12**	**0.25**	**0.20**	**0.15**	**0.01**

Source: Authors own calculation using HIES (1990-91) & (2001-02)

1 / Shaded area represents households that are below the poverty line for that year.

The disaggregated incidence of GST/VAT for 2001-02 is presented in Table 5.6. From this Table we can easily see the appearance of many new GST/VAT incidence categories that were not there in 1990-91 (for instance, edible oils, and fuels/utilities). At the national level we can see that the highest average GST/VAT incidence share (in terms of total GST/VAT incidence) is coming from food items averaging around 0.34 percent, followed by incidence share on fuels/utilities (0.28 percent), clothing and footwear (0.19 percent), POL products (0.15 percent), durables (0.08 percent), personal care (0.07 percent), and tobacco (0.04 percent). We can also clearly see that the GST/VAT incidence on food items, clothing (for the top fifty percent of population) and fuel/utilities appears to be regressive. This should not be a surprise given their underlying expenditure patterns show these to be necessities (for instance, see section 4.4 of previous chapter). On the other hand, GST/VAT incidence for durable items, and POL products, appears to be progressive (as these are also luxuries according to our discussion in section 4.4). Furthermore, the incidence trend for tobacco and personal care articles appears to be proportional for a large segment of population.

If we look at the urban GST/VAT incidence in 2001-02 we can see that food items on average appear to be *the* most significant incidence category (compared to POL products in 1990-91) responsible for almost 24 percent of total GST/VAT incidence. This is closely followed by an average incidence share of fuels/utilities at (0.20 percent), clothing (0.13 percent), POL products (0.11 percent), durables (0.05 percent), personal care (0.05 percent), and tobacco (0.03 percent) respectively.

A look at the GST/VAT disaggregated incidence trend for these categories reveals that for urban areas only GST/VAT incidence on durables items and POL products is progressive while GST/VAT incidence on clothing, tobacco and (all) food items appears to be regressive. Furthermore, the GST/VAT incidence for personal care items and fuels/utilities appears to be at best proportional (for a large segment of

population). Thus one of the reasons for somewhat proportional urban GST/VAT incidence in post- reform era appears to be a largely regressive pattern for food and clothing balanced to some extent against progressive incidence of POL products and durables.

If we look at the disaggregated incidence of GST/VAT items for the rural areas, perhaps it is no surprise to find food incidence share constituting the most significant GST/VAT incidence category (0.34 percent). The second and third most important GST/VAT incidence constituting category appears to be clothing items (0.19 percent) and fuels/utilities (0.14 percent). This is followed by GST incidence shares on POL products (0.10 percent), personal care (0.04 percent), tobacco (0.04 percent) and durables (0.03 percent). If we look at the incidence trend for these categories these are largely the same as in the urban areas. It appears to be progressive for durables items and POL products, but regressive for food items and clothing, and proportional for personal care articles and tobacco.

This information allows us to keep track of percentage increase in tax liabilities due to some of the main incidence categories over time. This information can help us to see how GST/VAT incidence increase over time (due to the rate increase, broad-basing and changes in underlying expenditure patterns) has affected different segments of population. It appears, for a Pakistani household GST/VAT liabilities overtime due to taxation of food items on average have increased by 76 percent, while this increase for the urban and the rural households on average has been around 71 and 75 percent respectively. Furthermore, increase in tax liabilities due to taxation of sugar has increased GST/VAT liabilities for a Pakistani household on average by 20 percent, but this increase for the urban and rural households has been 10 and (a gigantic) 37 percent respectively. Interestingly, tax liabilities due to GST/VAT taxation of tobacco have declined for urban population on average by 35 percent but increased for national and the rural household on average by 0.8 and 4.0 percent respectively. Furthermore, clothing incidence for a Pakistani household on average has increased

by 79 percent, while this increase for the urban and the rural areas on average has been around 74 and 78 percent respectively.

Thus, it appears GST broad-basing (and also change in rate and changes in underlying expenditure patterns) to include un-processed food items, vegetable ghee on top of sugar consumption that is already taxable, has relatively increased the GST incidence burden for the poor more as compared to other segments of population. This change, we believe, has been responsible for emergence of (largely) proportional GST incidence at national as well as the urban/rural areas over time.

Table 5.6: Incidence Shares (i.e. % of total GST incidence) for GST/VAT (2001-02)

	Deciles	Total food	*Sugar*	Edible Oils	*Veg. Ghee*	Fuels / Utilitis	*Kerosene*	*Gas-Pipe*	*Electricity*	Personal Care	Tobacco	POL products	Clothing & Footwear	Durables
Pakistan	1	0.40	0.12	0.18	0.17	0.25	0.007	0.03	0.16	0.05	0.06	0.06	0.21	0.02
	2	0.40	0.12	0.17	0.15	0.28	0.011	0.06	0.15	0.06	0.05	0.07	0.18	0.03
	3	0.39	0.12	0.16	0.14	0.28	0.008	0.06	0.17	0.06	0.06	0.08	0.19	0.04
	4	0.37	0.11	0.15	0.13	0.27	0.008	0.05	0.16	0.06	0.04	0.09	0.20	0.05
	5	0.37	0.11	0.15	0.12	0.28	0.006	0.07	0.17	0.07	0.05	0.11	0.20	0.05
	6	0.35	0.10	0.15	0.11	0.30	0.012	0.07	0.18	0.06	0.05	0.11	0.19	0.05
	7	0.32	0.08	0.13	0.10	0.25	0.005	0.07	0.15	0.06	0.05	0.12	0.17	0.06
	8	0.33	0.08	0.13	0.09	0.27	0.007	0.07	0.16	0.07	0.04	0.14	0.18	0.07
	9	0.27	0.06	0.10	0.06	0.24	0.006	0.06	0.15	0.06	0.03	0.14	0.16	0.08
	10	0.21	0.04	0.06	0.03	0.21	0.001	0.04	0.15	0.05	0.02	0.17	0.13	0.08
	Total	**0.34**	**0.08**	**0.13**	**0.09**	**0.28**	**0.006**	**0.07**	**0.18**	**0.07**	**0.04**	**0.15**	**0.19**	**0.08**
Urban	1	0.34	0.10	0.15	0.14	0.22	0.006	0.03	0.13	0.05	0.05	0.05	0.17	0.02
	2	0.33	0.10	0.13	0.12	0.24	0.008	0.05	0.14	0.05	0.04	0.06	0.15	0.03
	3	0.31	0.09	0.13	0.11	0.23	0.006	0.05	0.13	0.05	0.04	0.07	0.16	0.04
	4	0.29	0.08	0.12	0.10	0.23	0.006	0.05	0.14	0.05	0.04	0.09	0.16	0.04
	5	0.28	0.08	0.11	0.09	0.23	0.009	0.06	0.14	0.05	0.04	0.09	0.15	0.04
	6	0.27	0.07	0.11	0.08	0.22	0.005	0.06	0.13	0.05	0.04	0.11	0.14	0.05
	7	0.26	0.06	0.10	0.07	0.21	0.005	0.05	0.12	0.05	0.03	0.11	0.14	0.06
	8	0.23	0.05	0.09	0.06	0.21	0.006	0.05	0.13	0.05	0.03	0.12	0.14	0.07
	9	0.21	0.04	0.08	0.04	0.19	0.002	0.05	0.13	0.05	0.02	0.14	0.13	0.07
	10	0.15	0.02	0.04	0.02	0.16	0.000	0.03	0.13	0.04	0.01	0.15	0.09	0.06
	Total	**0.24**	**0.06**	**0.09**	**0.06**	**0.20**	**0.004**	**0.05**	**0.13**	**0.05**	**0.03**	**0.11**	**0.13**	**0.05**
Rural	1	0.41	0.14	0.18	0.18	0.11	0.013	0.00	0.08	0.04	0.06	0.06	0.21	0.01
	2	0.39	0.14	0.16	0.15	0.12	0.015	0.00	0.08	0.05	0.05	0.06	0.20	0.01
	3	0.39	0.14	0.15	0.14	0.13	0.012	0.00	0.09	0.04	0.05	0.07	0.20	0.02
	4	0.38	0.13	0.14	0.14	0.13	0.013	0.00	0.09	0.04	0.05	0.08	0.20	0.02
	5	0.37	0.13	0.14	0.13	0.13	0.013	0.01	0.08	0.04	0.05	0.08	0.20	0.02
	6	0.37	0.13	0.13	0.13	0.14	0.012	0.00	0.09	0.05	0.04	0.09	0.19	0.02
	7	0.35	0.13	0.13	0.12	0.14	0.012	0.00	0.09	0.05	0.04	0.09	0.19	0.03
	8	0.33	0.11	0.12	0.11	0.15	0.012	0.00	0.09	0.05	0.04	0.10	0.19	0.03
	9	0.30	0.10	0.11	0.10	0.16	0.011	0.01	0.10	0.04	0.04	0.13	0.18	0.04
	10	0.25	0.08	0.08	0.07	0.17	0.010	0.01	0.11	0.05	0.03	0.16	0.16	0.06
	Total	**0.34**	**0.12**	**0.12**	**0.12**	**0.14**	**0.012**	**0.00**	**0.09**	**0.04**	**0.04**	**0.10**	**0.19**	**0.03**

Source: Authors own calculation using HIES (1990-91) & (2001-02)

1 / Shaded area represents households that are below the poverty line for that year.

In Table 5.7 below, we do a simple exercise of exempting both sugar and vegetable ghee from GST net and analyse the distributional effect of this change. If both sugar and vegetable ghee are exempted from GST net, it will turn GST incidence at the national as well as for the rural/urban areas clearly progressive[96]. Another important thing to note is that gains from this policy clearly will benefit the rural areas as well as the poorest segment of population in general. For instance, exemption of sugar and vegetable ghee will decrease GST incidence for the rural area on average by 24 percent compared to 12 percent for the urban areas. Similarly the poorest segment of population in the rural and the urban areas will receive the largest decline as their GST tax liabilities will decrease by 31 and 25 percent respectively compared to the rural and urban richest ten percent of population which will only experience a 15 and 5 percent decline respectively. More importantly, exempting these items will make GST/VAT incidence at national level as well as at the urban/rural level clearly progressive[97].

Table 5.7: GST incidence with Sugar & Vegetable ghee exemption

Deciles	1	2	3	4	5	6	7	8	9	10	Avg
						National					
Actual GST	4.58	4.73	4.70	4.70	4.71	4.68	4.69	4.58	4.70	4.65	**4.67**
GST exclu. Sugar & veg. ghee	3.39	3.60	3.66	3.74	3.84	3.87	3.96	3.94	4.19	4.41	**4.08**
						Urban					
Actual GST	4.84	4.90	4.91	4.88	4.83	4.85	4.71	4.76	4.77	4.59	**4.80**
GST exclu. Sugar & veg. ghee	3.66	3.81	3.93	4.01	4.03	4.14	4.09	4.25	4.37	4.41	**4.21**
						Rural					
Actual GST	4.51	4.70	4.62	4.68	4.65	4.62	4.63	4.56	4.56	4.66	**4.62**
GST exclu. Sugar & veg. ghee	3.11	3.34	3.31	3.42	3.43	3.43	3.49	3.55	3.64	3.98	**3.53**

Source: Authors own calculation using HIES (2001-02)

[96] This is a simple exercise; it does not claim to maintain revenue neutrality.
[97] Except for the seventh decile households in urban as well as national level

However, the question of what must be exempt from GST/VAT in Pakistan is a critical policy question particularly as far as Governments pro-poor agenda is concerned. In the next section, we explicitly address the question of GST/VAT exemptions in order to determine how GST/VAT exemptions can be better targeted to provide relief to the poor.

5.3 Analysis of GST exemptions using Distributional Characteristics of a good approach

In the earlier section we have seen that the GST incidence for 2001-02 appears to be regressive. With that we have also seen that increase in GST incidence over time has been proportionally much higher for the poor segment of the population and for those in the rural areas. This is quite interesting since, on the one hand, policymakers in Pakistan claim to have adequately sheltered the poor against GST (by exempting basic items consumed by the poor) on the other hand our GST incidence results do not match with the policymaker's claims. Thus it is quite possible that GST exemptions are not working the way they are supposed to. Although in the earlier section we have briefly talked about GST exemption, in this section we will probe this issue empirically and attempt to evaluate how well placed GST exemptions in Pakistan really are by first addressing the issue of what is really being consumed by the poor in Pakistan[98].

The question of what the poor really consume in Pakistan has never been really addressed. Are only basic (un-processed) food items (namely, cereals, vegetables, pulses and fruits) more important to the poor as far as their budget is concerned? How

[98] For instance according to Ahmad and Stern (1987) a uniform VAT in India would reduce the expenditures of the poorest segment of population in the rural areas by almost 7 percent compared to 5 percent for the urban poorest. These estimates suggest a strong distributional case for exemptions in general and that such exemptions may play an important role in poverty reduction in developing countries (Bird and Zolt, 2005).

important is edible oil consumption to the poor? What sorts of fuel and utilities do the poor really consume? Now all of these are very important questions for the proper design of GST exemptions in Pakistan. Empirically, there is a growing but limited literature on the distributional characteristics of goods approach in the spirit of Feldstein (1972) (for application see, Newbery (1995) for Hungary and United Kingdom, Gibson (1998) for Papua New Guinea, Sonia et al (2003) for Ethiopia, and Liberati (2001) for Italy.

The underlying approach followed by the distributional characteristic approach measures how heavily consumption of each item is concentrated on the poor (Gibson, 1998). This measure is a direct complement of the theory of marginal tax reform (Newbery and Stern, 1987).

It was developed with the idea of creating a measure that both captures the welfare impact of price change as well as one that relies on the rich information available in the household surveys, while making minimum assumptions regarding the consumer behaviour. The only shortcoming of this measure is that it is strictly applicable for small changes in relative prices. It is able to quantify the direction of the welfare change but not its amount (Newbery, 1995).

The distributional characteristics of a good is defined by Newbery (1995) as[99]

$$d_i \equiv \frac{\sum_h \beta^h q_i^h}{\bar{\beta} Q_i} \qquad 5.2$$

Where β^h is the social marginal utility of transferring one Rupee to household *h*, q_h^i is the consumption of item *i* by household *h*, $\bar{\beta}$ is the average of social weights over all households and Q_i is the aggregate consumption of good *i*.

[99] Notations and explanation used in this methodology rely heavily on (Gibson, 2001).

This takes us to the issue of how to calculate the social weights. Although it must be admitted that there is no definite answer to this issue, this must be first agreed upon in order to measure the welfare changes[100]. The simplest functional form is based on Atkinson (1970) that uses social weights (based on a utilitarian framework) with a constant elasticity of substitution social welfare function so we follow this approach:

$$W = \frac{(c^h)^{1-v}}{1-v} \qquad v \geq 0, v \neq 1 \qquad 5.3$$

$$W = \ln(c^h) \qquad v = 1, \qquad 5.4$$

Where W is the value judgment we place on the income distribution, v is the coefficient of inequality aversion and c^h is the consumption level of household h. According to this, social weights are given by $\beta^h = (c^h)^{-v}$ [101]. Different values of v reflect judgments regarding the desirability of giving transfers or of levying taxes in order to correct income inequality. For the high inequality version, taxing one rupee from a poor household has four times the social cost of taxing a household with twice the income and (for lower inequality aversion) this ratio becomes 1.4 (Munoz and Cho, 2003). The use of social weights here are independent of other agent's utilities and prices (Liberati, 2001)[102] thus consistent with the marginal character of the

[100] According to Deaton (1997) these social welfare function can best be seen as "…statistical *aggregator* that turns into a single number that provides an overall judgment on that distributional and that forces us to think coherently about welfare and its distribution" (pp. 135). And also according to Deaton and Muellbauer (1980), "…better thought of as an aggregate weighing function of the individual opportunity sets…" (pp.225).

[101] For application see, Ahmad and Stern (1984); Newbery and Stern (1987); Kaiser and Spahn (1989); Ahmad and Stern (1991); Newbery (1995); Madden (1995a; 1995b), to name a few.

[102] According to Ahmad and Stern (1984), β^h can be thought of as "…a convenient local approximation given current prices and incomes rather than an exact expression holding all prices and incomes" (pp.279).

approach that identifies direction of reforms but not their amounts (Ahmad and Stern, 1984).

The distributional characteristics ranking for 165 items in the HIES (2001-02) is reported in Appendix 5.1 corresponding to relatively little, and higher inequality aversion ($v = 0.5, 2.0$). By looking at Appendix 5.1 we can see clearly that two out of the first four items are own produced and consumed items (namely beg gasses , and dung-cake). It is perhaps little surprise to find various food items ranked at the very start of the list (implying these are disproportionately more consumed by the poor). We find cereals ranked at the start of the list (for instance wheat is ranked 7, maize/barley ranked 17 and rice is ranked 19). Similarly some spices such as salt at 10 and chillies at 12, are proportionally more consumed by the poor. Additionally, some vegetables are ranked as quite important for the poor (for instance potato is ranked 18, onion at 25, karaila, lady finger, brinjal and cucumber ranked at 26 and tinda, pumpkin and bottle gourd are ranked 27). Pulses are also quite early on the list as expected (for example other pulses are ranked at 15, dal channa is ranked 21, moong at 23, and masoor at 38).

Perhaps it is a bit surprising to find some tobacco based items ranked so early (for instance biri is ranked at 3, raw tobacco at 16 and cigarettes at 24). Another surprise is to find some of home fuel items ranked so early (reflecting that these are disproportionately more consumed by the poor). For example, we find firewood ranked 11, coal ranked 14, charcoal ranked 31 and kerosene oil is ranked at 34. It is also a surprise to find items from the edible oil group ranked so early (for example, other oils and fats at 6, and vegetable ghee ranked at 13). We also find sugar and clothing items being disproportionately more important for the poor, for instance sugar is ranked 20 while clothing items are ranked 50.

Even under lower inequality aversion, using distributional characteristic ranking, we can find a clear difference in goods that are important for the poor and for the rich.

For instance, the first fruit to appear on the list is mango and it is ranked 70. Utilities such as electricity is ranked 82, gas pipe ranked 109 and gas cylinder 110, appear to be more important for the rich. Travelling expenditures such as travelling by train is ranked 107, petrol/diesel charges ranked 151, and air-travel ranked 154 appear to be highly skewed toward the richer segments of population. Within edible oil group it appears cooking oil is disproportionately more consumed by the rich as it is ranked at 130. Similarly, items related to educational expenses, health expense and housing also appear to be disproportionately more important for the rich.

If we use a higher inequality aversion, i.e. $v = 2.0$, we find some changes in the list but nothing too drastic[103]. Within the cereal group, we find wheat becoming more important for the poor as it moves from 7 to 6, while there is no change for rice flour (ranked 19) but maize, barley and jawar fall in rank from 17 to 37. If we look at fuel items that were important for the poor under low inequality aversion, we find firewood slightly falling down in ranking from 11 to 16, coal becoming very important as it moves to 2 from 14, while both charcoal and kerosene oil slightly fall in ranking (charcoal from 31 to 41 and kerosene 34 to 36). If we look at the edible oils, both other oils and fat (previously ranked 6 now 3) and vegetable ghee (previously ranked 13 now 11) become proportionally more important for the poor when higher inequality aversion is used.

Similarly, biri falls in ranking from 3 to 7, both cigarettes and raw-tobacco move up in the ranking (cigarettes move from 24 to 20 while raw-tobacco moves from 16 to 13). Utilities still remain important for the rich with electricity slightly falling down in ranking from 82 to 74, while gas pipe and gas cylinder appears to be even more skewed toward the richer segment of population. Similarly, travelling expenditures such as travelling by train, by-air and petrol/diesel charges appear to become more important for the richer segment of population. Also, edible oil items previously

[103] The fact that such listing do not appear to be too sensitive to the middle ranges of inequality aversion (i.e. 0.5 and 2.0) is also reported by Gibson, (1998) for Papua New Guinea, Sonia et al (2003) for Ethiopia, and Liberati (2001) for Italy.

important for the richer segment of population, namely cooking oil and desi-ghee become more skewed toward the richer segment of population.

Thus, this ranking is immensely important in the case of Pakistan because for certain categories it clearly shows exemptions that would be beneficial for improving distributional burden of GST as well for meeting Government‘s poverty alleviation initiatives. For instance, sometimes it is asserted that VAT exemptions cannot be better targeted than generally exempting basic food items since consumption patterns are not sufficiently separable to provide low-income household necessary protection. However, in the case of ranking for Pakistan (at such disaggregated level) we saw clear separable consumption patterns in key commodities that can be targeted to provide relief for the poor.

For instance information in Appendix 5.1 is summarized in Table 5.8 for key elements along with information on whether these are taxed or not. We can clearly see that within the edible oil group; other oils and fats (ranked 6 under low inequality aversion), vegetable ghee (ranked 13 under low inequality aversion) are important for the poor compared to cooking oil that is ranked 130 but all three are taxed. Similarly, within the fuel and utilities group basic fuels are disproportionately more consumed by the poor (even under low inequality aversion firewood is ranked 11, coal at 14, charcoal at 31 and kerosene oil is ranked at 34) while utilities such as electricity and gas-pipe are ranked at 82 and 109 (under low inequality aversion) but both categories are being taxed. Similarly, sugar ranked at 20 (under low inequality aversion) is taxed. Some food items such as chicken meat, mutton and particularly fruits are very high up in the ranking (thus benefiting the rich more) but these are exempt.

Thus looking at this list, if distributional issues and poverty alleviation issue are at the heart of Government policy agenda, it has an option to fine- tune exemptions that can help alleviate the burden of GST from the poor segment of population particularly within categories such as edible oils, basic fuels and sugar where there is a clear

difference between the types of commodities consumed by the poor and the rich and where revenue loss may not be significant.

Does this mean that distributional characteristics ranking of expenditure items in Pakistan is very different from other countries which requires a different pattern of exemptions? This question can be answered in the light of existing evidence of distributional characteristic ranking for Papua New Guinea (PNG), and Italy (former developing countries and latter a developed country) with prime exemptions candidates mentioned in the case of Pakistan (see previous discussion)[104]. In the case of Papua New Guinea (PNG), Gibson (1998) ranks 87 goods in the PNG survey. In the PNG case (under low inequality aversion), goods disproportionately more important for the poor are firewood (ranked 3), leaf tobacco (7), sugar cane (9), children clothing (16), adult clothing (23), sugar (26), kerosene (29) and cigarettes (37) while goods that were disproportionately more important for the rich included health, housing, travel expenses and expenses on electricity etc.

While in the case of Italy, Liberati (2001) provides ranking of 68 goods in the Italian HES survey and the main findings are as following. Under low inequality aversion, sugar is ranked 1, electricity (3), other meat (7), Pasta (8), beef (12), telephone (14), oil (15), gas (17), vegetables (16), other cereals (19), tobacco (21), medicine (24), coal (34), cloths (53), and kerosene (63).

Thus, it appears the distributional characteristic ranking in the case of Pakistan is more similar to PNG as compared to Italy. For instance, if we look at the Italian ranking, it appears, clothing items, kerosene and coal (under low inequality aversion) is being disproportionately more consumed by the rich! That is quite opposite to PNG and Pakistan. Additionally for Italy, it appears utilities such as gas and electricity are better candidates for exemptions compared to basic fuels. Also, we see other items

[104] Here a comparison with Ethiopia was not possible because the author did not include a complete listing with her work.

such as education, health expenses, telephone charges, appear quite early in the list which is not the case for either PNG or Pakistan. Thus, it appears that the distributional characteristics ranking in the case of a developing and a developed country can be different; as a result what is more important for the poor is also different. However, since GST/VAT reforms in most of the developing countries are designed and dictated by IFI's, it is perhaps no surprise to find that VAT/GST harmonization over the years has failed to take this difference into account (that can be very important for the poor).

5.4 Conclusion

GST/VAT is the most pervasive feature of tax reforms in many developing countries including Pakistan. This highlights the importance of evaluating GST/VAT incidence in Pakistan in both pre- and post- reform era to see how GST incidence at the national as well as the urban/rural levels has changed over time. And given, the current and future importance of this tax in many countries, it is also important to evaluate how this tax can be better structured (particularly via exemptions) to address the distributional issues. Thus, this chapter has tried to present the overall GST incidence picture along with the disaggregated incidence picture in order to clearly show how the underlying incidence is generated and how it has impacted various segments of population at both the national level and the urban/rural areas over time.

We have tried to highlight that certain steps in the reform strategy (such as GST/VAT broad basing to include processed food items such as sugar, vegetable ghee etc.) appear to be having strong distributional impact particularly as far as the poorest and most vulnerable segments of the population are concerned. Similarly extension of GST/VAT to basic fuels such as kerosene, firewood, coal etc. in order to maintain

GST/VAT uniformity appear to be creating significant burden for the poor and for those in the rural areas.

We also believe that the issue of GST/VAT exemptions in developing countries needs to be looked at more carefully if GST/VAT development over time has to keep in line with the Government pro-poor agenda. It appears at the moment policymakers in Pakistan are not paying sufficient attention to the fact that consumption patterns for key commodities are clearly separable. This separation should provide a very good opportunity to the policymakers to fine- tune GST/VAT exemptions to safeguard the poor (and not necessary at too much cost to the exchequer). And this chapter has tried to answer how GST/VAT exemptions can be better tailored to safeguard the poor in Pakistan.

Although analysis of the incidence of a single tax (in this case GST/VAT) over time is important on its own we do need to look at the overall indirect tax incidence over time for Pakistan in order to see how social incidence of indirect taxes in Pakistan has changed due to the *type* of reform process followed in Pakistan. This is undertaken in the next chapter which completes the discussion on the social incidence of indirect taxes at pre- and post- reform era in Pakistan by first looking at custom duty and excise duty incidence (in that order) and than completing the picture by bringing all components together.

Table 5.8: Distributional characteristics of items consumed in Pakistan (2001-02)

	Social Weights Based on			
	Low inequality aversion (v=0.5)		High inequality aversion (v=2)	
	d_i	Rank	d_i	Rank
Taxable Goods:				
(Important for the Poor)				
biri	1.056	***3***	1.08	***7***
gur/shakkar	1.041	***5***	1.04	***8***
other oils and fats	1.036	***6***	1.18	***3***
chewing tobacco & snuf	1.021	***9***	0.98	***14***
fire wood	1.015	***11***	0.96	***16***
vegetable ghee	1.011	***13***	0.99	***11***
coal hard & soft peat	1.010	***14***	1.20	***2***
sugar (desi or milled)	0.988	***20***	0.92	***24***
laundry soap, etc.	0.984	***22***	0.95	***18***
cigarettes	0.982	**24**	0.93	**20**
tea (black,green etc.)	0.969	***29***	0.86	***28***
char coal	0.968	***31***	0.84	***41***
kerosene oil	0.963	***34***	0.84	***36***
(Important for the Rich)				
electricity	0.870	***82***	0.66	***74***
expense travelling by train	0.808	***107***	0.453	***114***
gas (pipe)	0.802	***109***	0.46	***113***
gas (cylinder)	0.799	***110***	0.40	***125***
expense traveling by roads	0.768	***83***	0.42	***81***
cooking oils	0.750	***130***	0.36	***140***
cosmetics	0.750	***131***	0.41	***123***
telephone, telegraph, postal,	0.645	***149***	0.22	***150***
petrol/diesel charges	0.624	***151***	0.20	***153***
expenditure on air travelling	0.606	***154***	0.20	***154***
	0.560	***97***	0.153	***98***
Exempt Goods:				
(Important for the Poor)				
beggasses, agri. waste	1.097	***1***	1.37	***1***
dung cake (dry)	1.058	***2***	1.15	***4***
wheat and wheat flour	1.033	***7***	1.08	***6***
maize, barly, jawar etc.	0.998	***17***	0.84	***37***
potato	0.994	***18***	0.97	***15***
dal chana	0.987	***21***	0.93	***21***
moong	0.983	***23***	0.93	***22***
onion	0.981	***25***	0.92	***23***
karaila, lady finger,brinjal,co	0.978	***26***	0.90	***25***

Source: Author's own calculation using HIES (2001-02)

Chapter VI: Overall Indirect Tax Incidence in Pakistan (1990 – 2001)

6 Introduction

Our incidence analysis started in the previous section with determining the social incidence of GST during the pre- and post- reform time. Our analysis in the previous chapter showed that as a result of reform process the incidence of GST has increased substantially over time and the overall incidence looks proportional for most of the population. Although, it is meaningful to ascertain the incidence of a single component of tax system particularly GST/VAT (which in the case of Pakistan has emerged as the single most important tax component), what really matters is the collective tax incidence picture not its individual components. Thus, the main aim of this chapter is to determine the overall indirect tax incidence for Pakistan at the pre- and post- reform time. This is an extremely important issue because it will allow us to determine whether equity envisaged (as a part of reform process) was really translated into policy actions (that made the overall indirect tax system progressive).

For this purpose this Chapter is divided into four sections. We start with determining the incidence of remaining components of indirect tax system at the pre- and post- reform time before we put them together. This is important because it gives a clear and transparent picture of how the overall indirect tax incidence is being put together. Thus, the first section begins with determining the custom duties incidence at the pre- and post- reform time at national as well as for the urban/ rural areas, along with discussion on the underlying

methodology and assumptions used for incidence determination. The second section estimates the social incidence of excise duties at the pre- and post--reform time and provides a description of methodology used for incidence calculation. The third section moves to the main aim of this study, that is to determine the social incidence of overall indirect taxes in Pakistan at the pre- and post-- reform time. This section enables us to ascertain if the indirect tax system has really changed in line with the vision of RMTRC at least where equity is concerned, which is also the central question of this study. The last section concludes.

6.1 Custom Duty Incidence (1990-91) to (2001-02)

6.1.1 Measuring Imports Content (IMPCON) within Domestic Consumption

Since trade taxes are levied on the imported items, the base for determining payable custom duties is consumption of imported items *not* consumption of domestically produced goods. Thus, this section will try to establish how this study measures proportionate consumption of the imported goods within total domestic consumption of these goods, which is a clear improvement in the methodology used for estimation for trade tax incidence.

It is not an exaggeration to admit that determining custom duties incidence is not straightforward. The complication arises from the fact that in order to accurately assess the custom duties incidence we need to know the content of imported goods consumption within total domestic consumption (IMPCON) for each good (at respective level of unit of analysis which in our case is the

household). Since information in HIES survey does not distinguish between imported and domestically consumed goods we have no way of directly ascertaining this information from the survey. As a result, we have to rely on other data sources such as aggregate data on domestic production and aggregate import/export data in order to get some sense of this estimate. However, since data on domestic production and trade is available at an aggregated level we can only calculate the IMPCON ratio for a few broad categories of goods and henceforth use the same ratio for all items within that category.

The IMPCON ratio is calculated in the following way.

$$IMPCON_A = IM_A / (IM_A + DP_A - EX_A) \qquad 6.1$$

Where, $IMPCON_A$ is the imported content of good A within the domestic consumption of good A. IM_A is the import value, DP_A is the domestic production and EX_A is the export value of good A (all in PRs.). This relationship enables us to estimate proportionate imported content ($IMPCON_A$) for 19 categories of goods (see for instance Appendix 6.1).

6.1.2 Additional data sources used for calculating IMPCON

The additional data sources used for calculating IMPCON are as follows:

i. Production data[105]:

[105] Production data for Pakistan does not include data on other sectors such as services.

a. Agriculture production data is taken from the Agriculture Statistical Year Books for Pakistan (various years).
b. Manufacturing production data is taken from the Census of Manufacturing Industries (CMI) (1990-91) and (2000-01)[106].

ii. Import and export data:

a. Data on imports and export of agriculture goods is taken from the Agriculture Year Books of Pakistan (various years)[107].
b. Remaining import and export data is taken from the Statistical Yearbooks of Pakistan (various years)[108].

6.1.3 Additional assumptions

This section like the previous chapter uses the assumption that custom duties are fully borne by the consumers of tradable items and this assumption is made by a large number of studies for developed as well as developing countries. But this has been severely criticised by Shah and Whalley (1991) according to whom, the presence of binding quotas and tariff licensing scheme on trade taxes may result in tax shifting of less than a hundred percent since

[106] The (2000-01) manufacturing data is updated using (2001-02) sectoral growth rates as reported in Economic Survey of Pakistan (2001-02) which reports 5 percent growth rate for manufacturing sector. Thus, all categories covered in the CMI (2000-01) are updated using this rate except dairy products for which a 3.7% rate of growth of livestock GNP for (2001-02) is used.
[107] However, data on fruits, vegetables and condiment is taken from Fruit, Vegetables and Condiment Statistics for Pakistan (various years).
[108] With exception of trade data on pulses, edible oil, tea/coffee/green tea, and bakery products that is provided directly on request by Pakistan Custom House Karachi.

these taxes may more or less operate like lump-sum taxes; borne by the recipients of rents.

Although, this may be true in some cases, in the case of Pakistan, we believe using a hundred percent tax shifting assumption makes more sense because although earlier empirical evidence on shifting of trade taxes in Pakistan supports Shah and Whalley (1991) criticism (for instance see Pal, 1964; and Alamgir, 1968), later evidence on trade tax shifting supports a full or even higher tax shifting possibility (for example see Irfan, 1974; and Naqvi, 1975)[109].

Also, since most of the binding restrictions on quotas and import licensing scheme in Pakistan were largely removed by the early 1990's (for instance see World Trade Organization, 1995)[110], this makes trade tax structure in the decade of 1990 less relevant for the structure described by Shah and Whalley (1991). As a result, we feel that a hundred percent tax shifting assumption is the right assumption to use in this analysis.

6.1.4 Custom duty rates[111]

Custom duty rates for (1990-91) and (2001-02) are directly provided by the Central Board of Revenue (CBR), Pakistan on request. These rates were used as statutory rates for incidence calculation with two exceptions; (a) In cases where HIES expenditure category included more than one statutory rate, the weighted average duty rate was used, (b) in cases where duty rates were levied

[109] Tax shifting assumptions are discussed in detail in Chapter 3: Literature Review (pp.21-23).
[110] For instance see custom duty discussion in Chapter 2: Taxation in Pakistan (1985-2001), pp. 28-36.
[111] See Appendix 6.2 (pp. 270) for Custom duty rates for (2001-02) & (1990-91).

by weight (for instance edible oils and fats group and pharmaceutical products), effective duty rates were used.

6.1.5 Estimating Custom duty amounts and incidence

Now we are in the position to determine the calculation of custom duty incidence. This is calculated using the following equations:

$$D_{i,j} = \frac{c_j}{1+c_j}.e_{i,j}.IMPCON_j \qquad 6.2$$

where

$D_{i,j}$ = household *i*'s per capita custom duty payment on good *j*

c_j = statutory custom duty rate on good *j*

$e_{i,j}$ = observed expenses or post- tax per capita expenditures on good *j*

Similar to GST incidence, custom duty payable is also calculated with reference to only paid or formal market transactions. Payable custom duties on various dutiable items is summed across the relevant households and calculated on per capita basis. Additionally, average payable dutiable amount per decile is calculated by aggregating this amount over each decile and incidence is calculated with reference to average (net) total household per capita expenditure[112] for each decile.

[112] The progressivity, regressivity or proportionality definition used in this chapter is discussed in section 5.3.3. The same definition is used for all taxes.

6.1.6 Empirical Results

6.1.6.1 Custom Duty Incidence (1990-2001) at national level

The apparent difference in the importance of trade taxes within total federal structure of Pakistan over time is also evident in custom duty incidence. Custom duty incidence results are presented in Table 6.1. The custom duty incidence for an average Pakistani household in 1990-91 stood at 2.89 percent. The incidence for the poorest and richest ten percent of population on average stood at 3.26 and 2.22 percent respectively. This meant that the incidence faced by the richest ten percent of population was 32 percent less than the duty incidence borne by the poorest segment of population. If we look at the overall trend of custom duties incidence in (1990-91) at pre-reform era, it appeared to be clearly regressive. The results appeared to be largely driven by import duties on edible oils, sugar/sugar preparations, spice and condiment group and also wheat, which were important imported consumption commodities for the poor.

By (2001-02), the customs duty incidence for an average Pakistani household stood at 1.35 percent. The average custom duty incidence for the poorest and the richest ten percent of population in (2001-02) stood at 1.23 and 1.54 percent respectively. This meant that at the post--reform era the gap between what the poorest and the richest segment of population was paying narrowed to 25 percent. The incidence trend for (2001-02) except for sixth decile households appeared to be clearly progressive. Thus it appeared, as a result of the trade tax reform carried out during the decade of 1990s two things happened: (a) overall the level of incidence at national level was reduced by

fifty percent for most deciles; (b) the overall incidence in the post- reform era appears to have become progressive. This was mainly due to the combination of three different things over time; changing consumption patterns, change in dutiable rates and changes in IMPCON ratios. But, it is difficult to disentangle change in incidence over time due to these factors individually. However, it appears the progressivity of custom duties at the post-- reform time was largely driven by importance of POL product and miscellaneous expenditure items (such as bath soap, shampoo etc) within the budget of affluent households.

It appears over time, due to the tax reform process, custom duty tax liabilities for an average Pakistani household have been reduced by 53 percent. The highest reduction in tax liabilities over time is experienced by the poorest ten percent households which is equal to 62 percent, while the richest ten percent households have experienced only 31 percent decline in tax liabilities due to custom duty reforms over time. Thus we can say that the highest relief of scaling down of custom duties taxation is experienced by most deserving part of the population. This has been a fundamental change in the incidence of custom duties over time along with a clear change in the trend of underlying incidence of custom duties from a clearly regressive to a progressive pattern. The rural/urban results are also presented in Table 6.1, which are quite similar to the overall national results.

Table 6.1: Pakistan and Urban/Rural Custom Duties Incidence (1990-91)

		2001-02		1990-91	
	Deciles	**Duty Payable**	**Duty Incidence (%)**	**Duty Payable**	**Duty Incidence (%)**
Pakistan	1	58	1.23	160	3.26
	2	79	1.30	205	3.19
	3	90	1.30	229	3.04
	4	104	1.33	258	3.05
	5	118	1.35	285	2.98
	6	133	1.33	308	2.88
	7	155	1.36	340	2.76
	8	185	1.37	395	2.73
	9	243	1.40	484	2.63
	10	585	1.54	751	2.22
	Avg	**172**	**1.35**	**334**	**2.89**
Urban	1	63	1.17	168	3.08
	2	86	1.21	214	2.96
	3	105	1.24	254	3.01
	4	127	1.29	278	2.92
	5	143	1.27	313	2.89
	6	174	1.34	346	2.80
	7	206	1.34	396	2.74
	8	252	1.34	468	2.67
	9	368	1.42	577	2.42
	10	963	1.61	860	1.77
	Avg	**249**	**1.33**	**386**	**2.73**
Rural	1	56	1.25	155	3.29
	2	76	1.33	200	3.26
	3	86	1.32	220	3.09
	4	98	1.35	250	3.13
	5	106	1.33	271	3.04
	6	120	1.36	288	2.90
	7	134	1.36	316	2.83
	8	158	1.38	350	2.71
	9	193	1.40	439	2.78
	10	346	1.50	651	2.44
	Avg	**140**	**1.36**	**312**	**2.95**

Source: Authors own calculation using HIES (2001-02) & (1990-91).

Note: 1990-91 results are presented in 2001-02 prices.

6.2 Central Excise Duty (CED) Incidence (1990-91) to (2001-02)

Excise duty revenue was the second largest revenue source for Pakistan in the past but over time its relative importance has significantly declined. This change (as discussed in Chapter two) was a part of the overall indirect tax reform strategy where CED role was envisaged as being complementary to GST/VAT in taxation of luxuries. However, the scope of excise duties over time has remained quite narrow. For instance in 1990-91 five items were responsible for almost 75 percent of total CED revenue, this included cigarettes (33 percent), sugar (15 percent), cement (12.5 percent), petroleum products (8.7 percent) and beverages (4.4 percent) while in 2001-02, five items constituted almost 82 percent of total CED revenue; cigarettes (35 percent), cement (21 percent), petroleum products (11 percent), natural gas (9 percent) and sugar (6 percent).

6.2.1 Description of Central Excise Duty

Excise duty description (in cases where they apply to HIES items) is taken from the Effective Tariff of Central Excises Duty (1990-91) and (2001-02) and reported in Table 6.2.

Table 6.2: Central Excise Duty Evolution Over time
(1990-91) to (2001-02)

Item Description	**2001 – 02**	**1990 - 91**
Sugar Can	2.10/ kg	PRs. 2.15/ kg
Natural Gas[113]	PRs. 17.18 HCM[114]	85 paisa per DCM
Carbonated Bev.	10% of RP[115]	PRs. 3 / bottle
Squashes & Syrups	10% of RP	20% of RP
Fruit Juices	10% of RP	20% of RP
Ready made food consumed in a restaurant	Covered under Sales Tax	10% of charges
Soaps/ Cosmetics/ Hair Oils/ Laundry/ Shampoo	10% of RP	10% of RP
Detergent Bar	5% of RP	5% Ad Val.
Paper Napkins & other paper articles	Covered under Sales Tax	5% Ad Val.
Cigarettes	a/ If RP does not exceed PRs. 4.48/ten cig.; duty is PRs. 1.91 per ten cig c/ If RP exceeds PRs 4.48 but not PRs. 10 /ten cig; duty is PRs. 1.91 per ten cig. + 69% per incremental rupee of. c/ Exceeding PRs. 10 per ten cig; duty is 63% of RP	73% or 75% of RP
Biri	15% of RP	NA
Travelling by Train	12.5% of Charges in VAT mode (only on first class, parlour class and AC parlour)	10% of Charges (only on first class, parlour class and AC parlour)
Telephone, Telegraph, post-al, fax, email	15% of Charges in VAT mode	25% of Charges
Tableware/ kitchenware	5% Ad Val.	NA
Glassware	10% Ad Val.	10% Ad Val
Bulbs/Tubes etc.	Covered under Sales Tax	10% of RP
Travelling by Air	15% of Charges in VAT mode	10% of Charges
Refrigerator/ Freezer	10% of RP	NA
TV	Covered under Sales Tax	5% of RP

[113] Domestic consumers are exempted.
[114] Hectare cubic meter.

6.2.2 Further Assumptions

We have assumed that excise duty is fully borne by consumers of goods and services in terms of higher prices of these items. This simplifies incidence calculation in most cases except for cigarettes.

a. Cigarettes (2001-02)

The case of calculating excise duty on cigarettes for (2001-02) warrants more explanation since excise duty on cigarettes is levied according to three different tariff slabs. We can simplify the information presented in Table 6.2 as following:

a. If retail price per cigarette is no more than 0.448 paisa, excise duty is 0.191 paisa per cig.
b. If retail price per cigarettes is more than 0.448 paisa but no more than 1 rupee, excise duty is 0.191 paisa per cig plus 69 percent of incremental rupee or part of.
c. If retail price per cigarette is more than 1 rupeee excise duty is 63 percent of retail price.

Since there is no price information in HIES survey (and even if we get price information on cigarettes from some other source, it will be impossible to match this with HIES survey since consumers are not asked about the type of cigarettes they consume) we instead rely on unit values i.e. expenditure

[115] RP is retail price.

divided by quantities, information from within the HIES survey data. Although, it needs to be mentioned that unit values are not actual prices, they have been used as implicit prices (for instance see Deaton and Grosh, 1988; and Deaton 1995) in cases where price information is hard to come by or where it is hard to match this information with information presented in the survey data.

Although, it has been shown that unit values can be affected by quality choices i.e. someone buying better meat quality will pay more for that, spatial price variations of unit values have been found to be closely related to price variations especially when averaged over clusters (Deaton and Zaidi, 2002)[116]. Thus, we assume unit values for cigarettes are equal to the retail prices of cigarettes and this allows us to determine applicable duty slab for cigarettes. For example if a household consumed 100 cigarettes while spending PRs. 110 in total than according to our calculation the unit value or the implicit price of cigarette in this case will be 1.1, which according to our estimation falls within duty slab c. Although, it must be admitted that by doing this we are assuming that all 100 cigarettes consumed by the household are of the *same* type and purchased at the *same* price, which is quite a restrictive assumption but in the light of available information the only option. Once we know the respective duty slab applicable for household cigarette consumption we can use the information given above to determine the duty slab and duty paid[117].

b. Travelling by Train (1990-91) & (2001-02)

[116] For detailed discussion on using unit values as proxy for prices, see chapter 7.
[117] If unit value falls within slab b, excise duty is determined in two parts. Unit value is separated into two portions; that falls below 0.448 and the remaining unit value portion. These are then taken as weights to determine expenditure falling under a particular type of duty slab and duty is applied accordingly.

Since CED is levied only on passengers who are travelling in air conditioned compartment or in the first class parlour, duty is levied on only those households that lie in the top three expenditure deciles.

6.2.3 Calculating payable excise duty and incidence

Now we are in the position to determine the calculation of payable excise duty. This is calculated using the following equations:

$$Ex_{i,j} = \frac{ex_j}{1+ex_j}.e_{i,j} \qquad 6.3$$

where

$Ex_{i,j}$ = household i's per capita excise duty payment on good j

ex_j = statutory excise duty rate on good j

$e_{i,j}$ = observed expenses or post- tax per capita expenditures on good j

Similar to previous incidence calculation, payable excise duty is calculated with reference to only paid or formal market transactions. Payable excise duty on various dutiable items is summed together over the relevant households and converted to per capita basis. Average excise duty per decile is calculated by aggregating (and averaging over households) in each decile and incidence is calculated with reference to average (net) total household per capita expenditure for that decile[118].

[118] The progressivity, regressivity or proportionality definition used in this chapter is discussed in section 5.3.3. The same definition is used for all taxes.

6.2.4 National CED Incidence (1990-91) & (2001-02)

The CED incidence results for (1990-91) and (2001-02) are reported in Table 6.3. If we look at the 1990-91 results we can see that the CED incidence for an average Pakistani household stood at 1.88 percent. The average CED incidence for the poorest and the richest ten percent of population at pre-reform time stood at 1.55 and 2.15 percent respectively. If we look at the overall trend of CED incidence, at pre-reform time the overall incidence pattern for CED clearly appears to be progressive.

By (2001-02), the CED incidence at national level appears to be slightly reduced. This mainly appeared to be due to reduction in rates (see for instance Table 6.2) as well as changes in the underlying consumption patterns over time (for instance see chapter five). The post- reform CED incidence for average Pakistani household stood at only 1.02 percent while incidence for the poorest and the richest ten percent of households stood at 1.06 and 1.05 percent respectively. If we look at the overall trend of CED incidence during the post- reform time it appeared to be more or less proportional. Interestingly in (1990-91), CED incidence for the richest ten percent of households was almost 28 percent higher than their poorest counterparts but over time this difference was completely removed as by the end of the reform process, richest ten percent households were in fact paying on average 1 percent less than their poorest counterpart.

This picture is also reflected in the proportionate change in CED tax liabilities over time which reflects how CED scaling down gains are distributed across

similar segments of population over time. We see that an average Pakistani household experienced a 46 percent reduction in tax liabilities over time. But the gains were highest for the richest ten percent of population, which on average experienced 51 percent reduction in CED tax liabilities over time compared to the poorest ten percent of national population which experienced a 31 percent reduction in tax liabilities over time. Thus, at a national level it appears that CED reforms have generally provided more tax relief to the richer segment of the population and reforms have failed to maintain the progressivity of CED over time[119].

[119] The regional i.e. rural and urban CED incidence results are also presented in Table 6.3. Our results indicate that the level of CED incidence declined considerably over time. And even though CED incidence in urban areas was higher than in rural areas during the pre-reform era, this is not true for the post-reform era. It appears that over time a reduction in the CED regime has benefited (in terms of change in tax liabilities) the urban areas more than the rural areas and the benefits seem to be accruing more to the relatively rich segment of the population in both regions compared to their counterparts. Some of these issues can be better understood by looking at the disaggregated patterns of CED incidence over time.

Table 6.3: All Pakistan and Urban/Rural CED Incidence (1990-2001)

		2001-02		1990-91	
	Deciles	**Excise duty Payable**	**Excise duty Incidence (%)**	**Excise duty Payable**	**Excise duty Incidence (%)**
Pakistan	1	49	1.06	77	1.55
	2	62	1.04	112	1.74
	3	71	1.03	133	1.76
	4	78	1.00	155	1.84
	5	86	0.99	176	1.85
	6	98	0.99	208	1.98
	7	114	1.01	232	1.90
	8	130	0.96	285	1.98
	9	179	1.04	376	2.07
	10	382	1.05	783	2.15
	Avg	**123**	**1.02**	**245**	**1.88**
Urban	1	54	1.03	95	1.73
	2	70	0.98	134	1.86
	3	81	0.97	164	1.95
	4	91	0.94	182	1.92
	5	99	0.89	216	2.00
	6	127	0.99	255	2.09
	7	158	1.03	299	2.09
	8	199	1.07	352	2.03
	9	271	1.04	486	2.06
	10	596	1.06	1125	2.12
	Avg	**175**	**1.00**	**320**	**1.99**
Rural	1	46	1.05	68	1.42
	2	61	1.08	102	1.68
	3	66	1.02	126	1.78
	4	75	1.04	144	1.79
	5	82	1.04	166	1.87
	6	87	0.99	173	1.76
	7	102	1.04	207	1.91
	8	113	0.99	245	1.91
	9	130	0.94	325	2.07
	10	235	1.05	577	2.10
	Avg	**101**	**1.02**	**211**	**1.82**

Source: Author's own calculation using HIES (1990-91) and (2001-02)

6.2.5 Selected Excise Duty Commodity Incidence

One thing (as mentioned) earlier that remained constant during the pre and post- reform time was the narrow focus of excise duties. For instance in 1990-91 five goods were responsible for almost 70 percent of excise revenue and these included cigarettes, sugar, petroleum or POL products and beverages and these, more or less were also responsible in 2001-02 for around 80 percent of total excise duty collection. This narrow focus makes incidence analysis of excise duties quite interesting and makes it possible to see the impact of main component of excise duties at pre- and post-- reform time.

Table 6.4a presents five categories that made up almost 80 percent of total CED incidence in (1990-91)[120]. On average, cigarettes were the highest incidence creating category responsible for almost 37 percent of total excise duty incidence. This was followed by sugar (31 percent), beverages (12 percent), detergent (4.2 percent), and telephone/fax (1.6 percent) respectively. It appears the top three CED incidence creating categories for the poorest ten percent of households were sugar (40 percent share of total excise duty incidence), cigarettes (34 percent), and beverages (6.2 percent). While these for the richest ten percent of households were also cigarettes (contributing a share of 41 percent), beverages (18 percent) and sugar (16 percent).

If we look at the incidence trend of these components it appears CED incidence for sugar and detergent is clearly regressive, while cigarette incidence appears to be progressive for the bottom fifty percent of population and proportional afterwards. Furthermore, telephone/fax and beverages CED

[120] We were not able to measure CED incidence on POL products and cement because of difficulty of identifying relevant expenditure item in HIES survey as well as complicated CED slab structure in the case of formal.

incidence generally appeared to be progressive. Thus, it appears that CED progressivity at national level was largely driven by progressivity of telephone/fax charges as well as beverages. This was significantly supported by the progressive cigarettes incidence over the first half of the population and proportionality for rest of the population. And these factors, more than offset the regressivity of sugar CED incidence.

The combined incidence of these five categories in 2001-02 still appeared to be around 80 percent of total CED incidence. Table 6.4b shows disaggregated CED incidence at the post--reform era. In 2001-02, sugar became the top CED incidence category contributing around 31 percent of the total CED incidence. This was followed by cigarettes at 29, telephone/fax and detergents both at 7.5 percent and beverages at 3.2 percent.

In 2001-02, the top three CED incidence generating categories for the poorest ten percent of population were cigarettes, sugar and detergents, each contributing around 38, 34 and 10 percent of total CED incidence respectively. while for the richest ten percent of households the top three incidence generating categories were telephone/fax, cigarettes and sugar, each responsible for 31, 18 and 15 percent of total CED incidence respectively.

If we look at the individual incidence trends, it appears to be progressive for beverages and telephone/fax; regressive for cigarettes, sugar and detergents. Thus, over time regressivity of cigarettes (due to change in CED duty slabs as well as of changes in underlying consumption patterns) on top of regressivity of sugar (that also existed in the pre- reform era) has significantly affected the post- reform CED incidence. The overall CED incidence at post- reform time at best appears to be proportional as regressivity of sugar and cigarettes is balanced against the progressivity of beverages and telephone/fax charges.

These concerns are further highlighted when we look at urban/rural results particularly at the top and bottom ten percent of population and for top three incidence creating categories. For instance, in 1990-91, the top three incidence creating categories for the bottom ten percent of population in the urban areas were sugar (40 percent), cigarettes (30 percent) and detergents (11 percent). For the richest ten percent of population, the top three incidence creating categories included cigarettes contributing 37 percent of total CED incidence, 24 percent for beverages and 13 percent for telephone/fax.

As for incidence trend, sugar appeared to be clearly regressive, cigarettes progressive over first half of the population and regressive afterwards, telephone and fax charges and detergent remained generally progressive. Thus, again progressivity of CED incidence at pre- reform time for urban areas was generally driven by cigarettes incidence which was progressive over first half of the population and its regressivity for the top fifty percent of the population was more than offset by progressivity of telephone/fax charges and beverages over that segment of population.

During the same time in the rural areas the top three incidence generating categories for the poorest ten percent of population were sugar (34 percent), cigarettes (26 percent) and detergent (5.4 percent). while for the richest ten percent of population the top three CED incidence categories were cigarettes (41 percent), sugar (22 percent) and beverages (15 percent). However, the progressivity of CED incidence for rural areas was largely driven by cigarette incidence that appeared to be generally progressive over most of rural population and it was strongly supported by beverage incidence that was clearly progressive.

In 2001-02 in the urban areas the top three incidence creating categories for the poorest ten percent of population were cigarettes (38 percent), sugar (31

percent) and detergent (9 percent) while for the richest ten percent households these were telephone/fax (43 percent), cigarettes (14 percent) and sugar (7.6 percent). Thus, in urban areas similar to 1990-91 there were significant variation in terms of which goods were mainly responsible for CED share for the urban poorest and the richest ten percent of the population. The incidence trend for sugar, detergent and cigarettes again appeared to be clearly regressive, while CED incidence for telephone/fax and beverages was progressive.

For the poorest ten percent of households in the rural areas, the most significant CED incidence share came from cigarettes (38 percent), followed by sugar (36 percent) and detergents (11 percent) while for the richest ten percent households the most significant category this time was sugar (23 percent), cigarettes (22.8 percent) and telephone/fax (17 percent). Thus, for rural households in all deciles compared with the urban population sugar remained the most significant incidence category.

As for incidence trend in post- reform era for both the urban and rural areas, results were largely driven by a clear regressive pattern of CED incidence on cigarettes (both due to change in rate and due to changes in the underlying consumption patterns). This along with regressive sugar incidence created a strong regressive CED setup that to some extent was neutralized by the progressivity of telephone/fax charges but this was not enough to create progressivity in the overall urban/rural CED incidence.

Table 6.4a: Selected Excise Duty Incidence Shares in (1990-91) as (percentage of total CED incidence)

Deciles	Sugar	Bev	Detergent	Tel/fax	Cig.	Total
Pakistan						
1	39.7	6.2	5.9	0.2	33.7	85.7
2	39.0	9.6	5.1	0.5	31.6	85.8
3	37.7	8.7	4.8	0.5	34.6	86.2
4	34.4	11.5	4.7	0.9	34.9	86.3
5	33.1	8.3	4.4	0.9	39.4	86.1
6	33.4	13.6	4.1	0.7	34.4	86.2
7	29.5	11.4	4.2	0.7	40.2	86.0
8	26.5	14.1	3.8	1.4	38.5	84.3
9	23.9	17.1	3.1	2.6	38.2	84.9
10	16.1	18.2	2.4	7.1	41.4	85.2
Avg	**31.0**	**12.1**	**4.2**	**1.6**	**36.8**	**85.7**
Urban						
1	39.8	10.5	5.0	0.4	30.2	85.9
2	34.8	9.3	4.5	0.5	36.4	85.6
3	34.8	13.6	4.3	0.6	32.5	85.7
4	29.1	9.2	4.1	0.7	42.1	85.2
5	27.2	10.5	3.9	0.7	44.0	86.3
6	25.3	15.1	3.7	0.6	41.7	86.5
7	23.8	11.7	3.5	1.6	45.5	86.0
8	22.2	19.6	3.3	2.5	35.9	83.6
9	17.0	21.2	2.8	6.7	38.1	85.8
10	8.7	24.1	1.7	13.0	36.5	84.0
Avg	**25.7**	**15.6**	**3.9**	**2.9**	**36.4**	**84.4**
Rural						
1	34.0	4.4	5.4	0.1	26.0	69.9
2	35.6	8.1	4.9	0.4	28.7	77.7
3	34.6	6.8	4.5	0.4	33.0	79.2
4	34.5	9.1	4.5	0.7	32.0	80.8
5	32.1	8.2	4.2	1.0	35.7	81.3
6	27.3	11.0	4.0	0.6	29.1	71.9
7	36.4	9.7	4.1	0.9	27.9	78.9
8	27.6	12.2	3.9	0.5	35.7	79.9
9	26.9	13.8	3.5	1.3	39.5	84.9
10	22.0	15.4	2.8	3.3	41.2	84.7
Avg	**30.8**	**10.5**	**4.4**	**1.0**	**30.8**	**77.5**

Source: Author's own calculation

Table 6.5b: Selected Excise Duty Incidence Shares in (2001-02) as
(percentage of total CED incidence)

Deciles	Sugar	Bev	Detergent	Tel/fax	Cig.	Total
Pakistan						
1	34.3	0.9	9.9	0.6	37.7	83.4
2	36.6	1.6	9.1	0.8	33.1	81.1
3	35.2	2.1	8.6	1.5	33.2	80.6
4	35.7	2.4	8.2	1.9	30.9	79.1
5	35.1	2.7	8.0	3.5	29.0	78.2
6	33.9	3.0	7.4	4.4	30.4	79.1
7	30.1	3.8	7.2	7.5	29.2	77.7
8	29.0	4.2	6.7	9.6	25.4	74.9
9	22.7	5.0	5.5	16.1	25.3	74.6
10	14.7	6.7	4.0	30.7	17.8	73.8
Avg	**30.8**	**3.2**	**7.5**	**7.6**	**29.3**	**78.3**
Urban						
1	31.1	1.4	8.8	1.7	37.5	80.6
2	32.0	2.7	7.9	3.3	32.1	78.0
3	29.4	3.6	7.5	3.5	32.8	76.7
4	28.0	3.9	7.0	8.3	26.2	73.5
5	27.7	3.9	7.1	11.3	25.5	75.6
6	21.9	5.0	5.9	12.5	29.1	74.4
7	19.2	4.9	5.2	15.8	23.4	68.5
8	16.2	5.2	4.4	23.4	24.7	73.9
9	13.5	6.5	4.2	31.5	18.0	73.8
10	7.6	7.2	2.8	43.3	13.8	74.6
Avg	**22.1**	**4.5**	**5.9**	**15.9**	**24.6**	**73.0**
Rural						
1	35.9	0.9	10.6	0.4	37.5	85.3
2	40.6	1.5	10.2	0.7	37.8	90.8
3	39.1	1.5	9.5	0.8	34.0	84.9
4	40.8	2.2	9.2	1.2	35.7	89.2
5	41.2	2.6	9.6	2.2	37.1	92.8
6	38.0	2.4	8.0	2.2	30.1	80.6
7	35.5	3.0	7.5	3.6	31.0	80.6
8	30.8	3.3	7.2	4.5	26.4	72.2
9	29.1	3.6	6.4	6.7	24.1	69.8
10	23.3	5.8	5.4	16.5	22.8	73.8
Avg	**35.0**	**2.7**	**8.1**	**4.1**	**29.6**	**79.6**

Source: Author's own calculation

6.3 Total Indirect Tax Incidence for Pakistan (1990-91) to (2001-02)[121]

After having examined the pre- and post- reform incidence for GST (Chapter five) and incidence for custom duties and excise duty in this chapter we are now in a position to address one of *the* core questions of this study i.e. the overall incidence of indirect taxes in Pakistan at pre- and post- reform times. This will allow us to see how the indirect tax incidence over time has changed due to the tax reform process embarked in the 1990s and to ascertain if the equity concerns envisaged in the pre- reform strategy really got translated into positive policy actions aimed at making the overall indirect tax incidence pro-poor or not.

6.3.1 National level results[122]

The total indirect tax system incidence results for (1990-91) and (2001-02) are presented in Tables 6.5. The results for the pre-reform era i.e. (1990-91) show that the total indirect tax incidence for an average Pakistani household stood at 6.32 percent. The overall incidence for the poorest ten percent of households stood at 6.11 percent while the incidence for the richest ten percent of households stood at 6.16 percent. If we look at the overall incidence trend at the pre-reform time it appears to be of inverted U-shaped with higher indirect tax incidence faced by the middle portion of population compared to the population at the tails. If we look at how total indirect tax incidence is being constituted for an average household at national level, almost 47 percent of

[121] Incidence is this section is calculated by accumulating tax liabilities over net paid expenditures for three taxes, namely custom duties, excise duty and sales tax.
[122] Although the overall indirect tax incidence results at the regional level i.e. urban and rural are also presented in Table 6.5, there are no major differences.

total indirect tax incidence is coming from custom duties, while 30 and 21 percent incidence is coming from CED and sales tax respectively. Thus it appears that the inverted U-shaped incidence trend was mainly due to the regressivity of custom duty incidence which more than counterbalanced progressive patterns for CED and GST tax at the pre-reform time.

In (2001-02) i.e. also the post- reform time an average Pakistani household faced an overall indirect tax incidence of 7.31 percent. The indirect tax incidence for the poorest and the richest ten percent of the population stood at 7.14 and 7.56 percent respectively. If we look at the overall trend of indirect tax incidence at the post- reform era it appears to be progressive (excluding the second, sixth and eight decile households). However, one important thing to note is that the poorest ten percent of population now bear lowest indirect tax incidence while the top ten percent of population bear the highest indirect tax incidence, which is a positive development over time.

If we look at the constitution of total indirect tax incidence at the post-reform era, for an average Pakistani household almost the lion's share i.e. 65 percent of total indirect tax incidence came from GST/VAT, while remaining 19 and 15 percent of indirect tax incidence came from custom duties and CED. Thus, it appeared shifting reliance from trade taxes to GST/VAT revenues over time was mainly responsible for making the overall indirect tax incidence progressive, although we believe that progressivity of the current system at lower deciles has been limited (also evident from the national incidence pattern) because of taxation of processed food items such as sugar and vegetable ghee and basic fuel such as kerosene (also highlighted in chapter five).

Table 6.6: All Pakistan and Urban/Rural Indirect Tax Incidence (1990-2001)

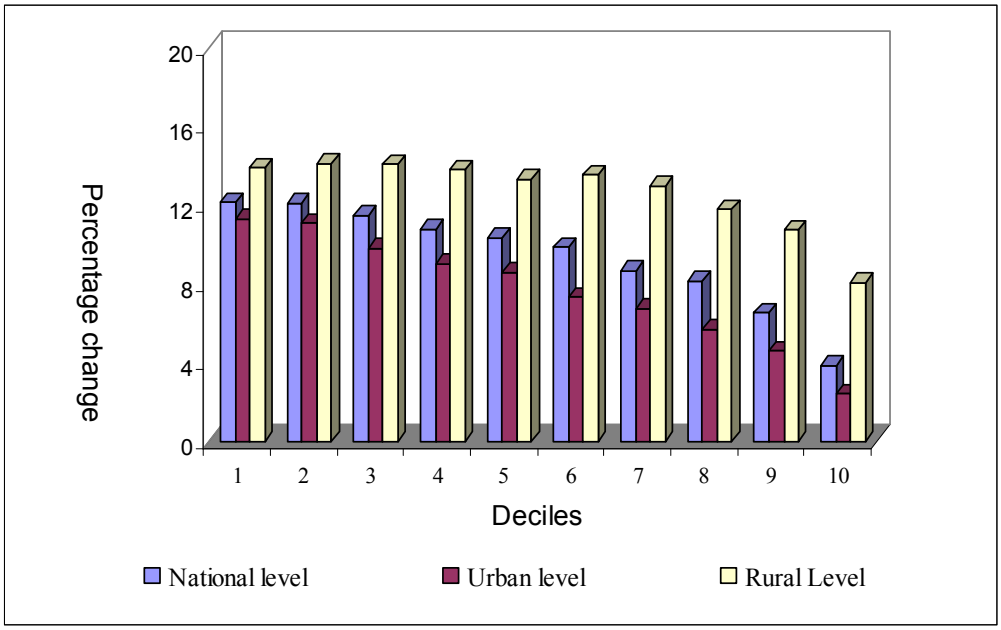
	Deciles	2001-02	1990-91
Pakistan	1	7.14	6.11
	2	7.34	6.43
	3	7.30	6.30
	4	7.30	6.43
	5	7.32	6.40
	6	7.26	6.45
	7	7.33	6.27
	8	7.17	6.31
	9	7.43	6.36
	10	7.56	6.16
	Avg	**7.31**	**6.32**
Urban	1	7.30	6.14
	2	7.35	6.28
	3	7.39	6.49
	4	7.37	6.40
	5	7.23	6.49
	6	7.46	6.57
	7	7.36	6.48
	8	7.45	6.37
	9	7.53	6.10
	10	7.57	5.53
	Avg	**7.40**	**6.31**
Rural	1	7.06	5.98
	2	7.39	6.45
	3	7.22	6.40
	4	7.34	6.49
	5	7.29	6.47
	6	7.23	6.18
	7	7.30	6.30
	8	7.21	6.20
	9	7.18	6.55
	10	7.52	6.34
	Avg	**7.27**	**6.33**

Source: Author's own calculation using HIES (1990-91) and (2001-02)

Note: Shaded area represents households that are below poverty line for that year.

For instance, if we look at Figure 6.1 we can see that taxation of sugar (via GST/VAT and CED) is responsible for almost 8 percent of total indirect tax incidence for an average Pakistani household and 10-12 percent of total indirect tax incidence for the bottom fifty percent of population. But for the richest fifty percent of national population sugar incidence fell quite sharply to under 4 percent of total incidence. Thus, we believe this is one of the reasons for limited progressivity exhibited by the overall indirect tax incidence at national level despite a shift from trade taxes to GST/VAT for the bottom fifty percent of population at the post--reform scenario.

Figure 6.1: Share of Sugar incidence in total indirect tax incidence (2001-02)

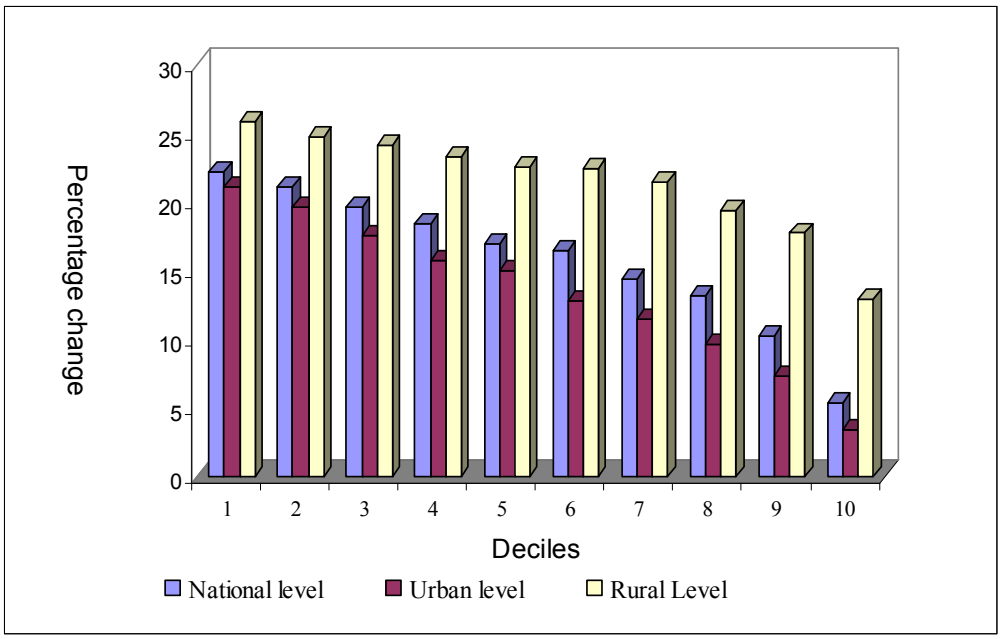


If we look at Figure 6.2 it shows the combined incidence of sugar, vegetable ghee and kerosene oil as a proportion of overall indirect tax incidence. We have purposely selected goods that were flagged to be proportionally more important for the poor (for instance see chapter five) and which were also the

main incidence categories in the post-reform era. It is perhaps no surprise to find that although these three items were responsible for only 12 percent of overall indirect tax incidence for an average Pakistani household but these together constituted around 22 percent of total incidence for the bottom ten percent of national households.

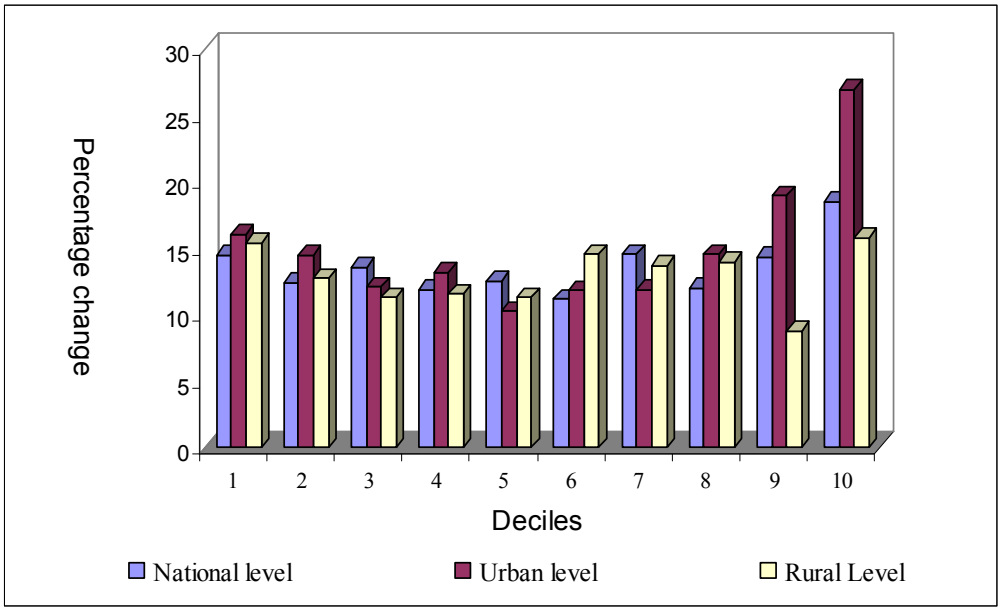
Furthermore, for the bottom four deciles also flagged as the 'poor', the incidence share of these three goods within overall indirect tax incidence remained as high as 18 percent. On the other hand, for the top fifty percent of population the combined incidence share of three goods fall quite sharply, declining to a mere 12 percent for the richest ten percent households. Thus, we believe high incidence share coming from these three items has been responsible for not only restricted progressivity of the overall indirect taxes despite a shift from trade taxes to GST/VAT in the post-reform era but also responsible for keeping incidence for the 'poor' segment of population comparatively quite high.

Figure 6.2: Share of Sugar, Kerosene-oil and vegetable ghee incidence in total indirect tax incidence (2001-02)



If we look at how overall indirect tax liabilities have changed over time at national level, this is presented in Figure 6.3. Even though tax reforms of 1990s have slightly increased the level of overall indirect tax incidence for all segments of population, this increase has been almost the same for the bottom fifty percent; ranging from 12-14 percent while increase in indirect tax liabilities due to the reform process for the richest forty percent of the population has been between 11 – 18 percent. As a result, this has added progressivity at the top fifty percent of population but not for the bottom fifty percent of population.

Figure 6.3: Percentage change in tax liabilities: National and Regional Results (1990-2001)



6.4 Conclusion

The Pakistan federal tax structure relies heavily on indirect taxes as the prime source of revenue. Like many developing countries, Pakistan also embarked upon a substantial tax reform process during the decade of 1990s with the main aim of revenue mobilization. But this reform strategy also gave substantial importance to equity considerations and envisaged addressing both issues via revitalizing direct taxes (that later did not materialize) as well as the replacement of trade taxes with GST/VAT revenues, with latter expected to be "pro-poor" as a result of well targeted GST/VAT exemptions.

It would not be wrong to say that even though tax reforms of the 1990s have increased the tax liabilities for an average Pakistani household at the national level by 15 percent, reforms have been generally progressive for national as well as for the urban areas. This is a clear break from the pre-reform era in which the overall indirect tax incidence at national as well as the urban/rural levels at best appeared to be of inverted U-shaped. Thus, we do believe that our overall indirect tax incidence results at national as well as for the urban areas support Gemmel and Morrissey (2003) finding that for most developing countries a move away from import taxes to sales taxes has generally been progressive.

Although this result is not apparent in the rural areas, we believe one of the main reasons for this is the existing taxation of sugar, vegetable ghee and kerosene oil, which are responsible for almost a quarter of total indirect tax incidence for the poorest ten percent of households. These items have been flagged (in the previous chapter) to be proportionally more important for the poor, thus best candidate for GST/VAT exemptions on distributional grounds.

And our incidence results clearly support our previous findings. And results show that post reform progressivity of the overall indirect tax system for urban/rural poor and for rural areas in general have been marginalized by taxation of sugar, vegetable ghee and kerosene oil.

We have found sufficient differences in the consumption patterns of the poor in Pakistan that allows for better targeting of exemptions particularly where basic fuels, sugar and vegetable ghee consumption is concerned (for instance see chapter five). These consumption patterns are found to be quite different from developed countries. Thus, if poverty alleviation and distributional concerns are important for the policy makers in developing countries, general rule of thumb for GST/VAT exemptions may not work. And policy making has to be more sensitive to the indigenous factors.

In this chapter, our incidence results still hinge on the no-behavioural response assumption. In the next chapter we try to evaluate how incorporation of behaviour responses will change our results and also try to propose direction of reforms that can be welfare improving at margin.

CHAPTER VII: Using Demand Analysis to Evaluate Price and Tax Reforms in Pakistan (2001-02)

7 Introduction

The aim of this chapter is to go beyond the distributional analysis of tax incidence by estimating own- and cross- price elasticities using spatial price variation in the survey data. The intentions are multiple: (a) to provide useful discussion on why estimates of elasticities are important for *ex-ante* tax policy planning and tax reform analysis; (b) to illustrate how or if tax incidence estimates from earlier chapters are sensitive to demand responses; and (c) to recommend the future directions of welfare enhancing reforms for Pakistan at margin.

For this purpose this chapter is divided into eight sections. The first section provides a brief description of the general approach. The second section talks about unit values and how they can be used to estimate implicit or proxy prices from survey data and problems and issues related to this conjecture. Section three talks in depth about Deaton's (1988;1990;1997) methodology that can be used to estimate spatial price variation from survey data. Section four talks about basic data information i.e. cluster structure of HIES (2001-02) for Pakistan, basic summary information on dependent and independent variables that will be used in this analysis as well as providing important information on how unit values vary across clusters as well as over time. The fifth section provides the results of the first stage of estimation as well as final own- and cross- price elasticity estimates for Pakistan for (2001-02). The sixth

section will try to illustrate if partial equilibrium tax incidence estimates from earlier chapters are sensitive to incorporation of demand responses. The seventh section starts with a brief explanation of theory and methodology of marginal theory of tax and price reform and concludes with providing recommendations on the future direction of tax reforms particularly for VAT for Pakistan that can be welfare enhancing (and are in line with efficiency and equity criteria). The last section concludes.

7.1 Basic approach

This chapter aims at estimating price elasticities using spatial price variation in the survey data to estimate demand functions, by taking unit values as proxies for prices. The survey data that used for this estimation is the Household Integrated Economic Survey (HIES) 2001-02 for Pakistan. The following sections provide detailed description of various issues related to this methodology as well as our results.

7.2 Why Unit Values?

In order to determine the welfare price effect of a tax change we must begin with understanding how households will respond to price changes. Such information is also critical for design of effective tax or subsidy policy. However, modelling consumer behaviour is not easy because it requires accurate and robust price information (that requires historical time series data on prices). According to Deaton (1988) availability of such data is a rarity even for developed countries let alone developing countries[123]. Although in

[123] For instance see [Barton, 1969] for classic attempt using data on Holland and [Deaton, 1974a] using time series data on UK.

many cases some price data is collected by the statistical offices, in many developing countries such data is available only at: (a) a geographically aggregated level and (b) for a few years only. This, therefore rules out a possibility of using this price data source for constructing robust price elasticity estimates.

However, many developing countries do have cross-sectional survey data of very good quality collected for a reasonable span of time. Such surveys report data on both expenditures and quantities consumed by households for a wide variety of goods. Dividing expenditures by quantity gives us unit values for each items purchased by the households, ratio of expenditure to quantities, which can be used as proxies for prices (Disney et. al, 2004).

However, unit values are not the same as 'prices' and can not be directly treated as market prices without adjustment in quality differences in purchases across households (Houthakker, 1952; Theil 1952; and Deaton, 1988), adjustment for units of measurement (Prais and Houthakker, 1955), as well as other sources of measurement error (Timmer and Alderman, 1979; Strauss, 1982; .Prais and Houthakker, 1955). Although, unit value has been used directly for estimation of price elasticities (Deaton, 1988; Timmer and Alderman, 1979; Timmer, 1981; and Pitt, 1983), failure to address quality effects within prices can lead to parameters being different from what would have been otherwise (Cox and Wohlgenant, 1986). But if the appropriate adjustment in unit values can be made, the usefulness of information contained in unit values cannot be denied particularly for developing countries where price data is so scarce (Deaton, 1988).

7.3 Deaton's Methodology[124]

[124] This section relies heavily on Deaton (1988; 1992; 1997) for notations and explanations.

Deaton (1988; 1990; 1997) proposes a methodology aimed at estimated spatial price variation from unit values in order to estimate price elasticities using survey data. The basic assumption of this methodology is that households belonging to the same cluster face the same prices. Since households belonging to the same cluster in a survey are more or less interviewed at the same time (in order to minimize travel cost) this assumption is quite realistic particularly for rural areas where a single market exists. Once this assumption is made the idea is to use cluster information on expenditures and unit values to estimate the effects of household income and demographics characteristics on quantities and qualities. The demand system can then be estimated on the basis of inter-cluster variation in corrected quantities and unit values.

Before we start with Deaton's methodology we need to understand how he models quality. According to Deaton (1997) the most suitable way of thinking about quality is to define quality as a property of commodity aggregates. According to this definition if q_{ic} denotes the household's vector of consumption levels of good *i* within the group consumed by household in cluster *c*, than the group quantity index Q_{ic} can be written as:

$$Q_{ic} = k_i . q_{ic} \qquad 7.1$$

where k_i is used to add quantities of items in the group. Corresponding to the quantity vector is a price vector, p_{ic}, which contains no price variation since each commodity that makes up commodity vector is perfectly homogenous. Thus, we can write p_{ic} as:

$$p_{ic} = \pi_{ic} . p_i^0 \qquad 7.2$$

where π_{ic} is a scalar measure of the level of prices in the group and p_i^0 is the reference price vector. According to the notation we can see that price level π_{ic} varies between clusters but not within households while reference price vector p_i^0 remains constant across clusters. Now if group expenditure x_{ihc}, is equal to $p_{ic} \cdot q_{ic}$, equation 7.1 and 7.2 can be used to write the following identity:

$$x_{ic} = p_{ic} . q_{ic} = Q_{ic} (p_{ic} . q_{ic} / k_i . q_{ic}) = Q_{ic} \pi_{ic} (p_i^0 . q_{ic} / k_i . q_{ic}) \qquad 7.3$$

Where the term in brackets in equation 7.3 is the measure of quality (ξ_{ic}). which can be defined as:

$$\xi_{ic} = p_i^0 . q_{ic} / k_i q_{ic} \qquad 7.4$$

So we can re-write unit values using equation 7.3 as a product of quality and prices:

$$v_{ic} = x_{ic} / Q_{ic} = \pi_{ic} (p_i^0 . q_{ic} / k_i . q_{ic}) = \pi_{ic} \xi_{ic} \qquad 7.5$$

After defining unit values and quality we are in a position to explain his procedure which essentially is based on two equations used to estimate budget shares and observed unit values. In essence budget share and unit value equations are being estimated using cluster level information on household total (per capita) expenditures as well as other demographic variables, such as household size etc. These two equations can essentially be written as:

$$w_{ic} = \alpha_1 + \beta_1 \ln x_{ic} + \gamma_1 z_{ic} + \sum_{H=1}^{N} \theta_{ic} \ln p_{jc} + f_c + u_{ic}^1 \qquad 7.6$$

$$\ln v_{ic} = \alpha_2 + \beta_2 \ln x_{ic} + \gamma_2 z_{ic} + \sum_{H=1}^{N} \psi_H \ln p_{jc} + u_{ic}^2 \qquad 7.7$$

where w_{ic} is the budget share of good *i* in cluster c, x_{ic} is the total household expenditure, v_{ic} is the calculated unit values, and z_{ic} is the vector of household characteristics, all of which are observed. However, other terms such as prices p_{jc}, the cluster fixed effects f_c (represent unobserved taste variation among different clusters, which is homogenous or shared by all households in a cluster) and error terms u_{ic}^1 and u_{ic}^2 are all not observed. Additionally, it is assumed that cluster fixed effects f_c are uncorrelated with the unobservable prices so that even when both variables are unobservable, price elasticities can be measured. The error term u_{ic}^1 contains usual unobservable as well as measurement error in the share equation. Additionally, it is assumed that they are correlated with the error term u_{ic}^2 in the unit value equation which also includes measurement error in unit values .

We can see that equations 7.6 and 7.7 contain different dependent variables. The unit value equation i.e. equation 7.7 is kept slightly different because unit values unlike unobservable prices vary from household to household within the same commodity group. These are linked with prices through β_2 (i.e. elasticity of quality with respect to total expenditure) in the unit value equation. If there was no measurement error or unit values were equal to prices, the matrix ψ_H would be an identity. Also it is important to mention that the cluster fixed effect term because of identification issues only appears in the share equation but not in the unit value equation because if it did it would break the direct link between prices and unit value.

Now we are in a position to explain Deaton's estimation procedure given underlying assumption and structure as has been mentioned above.

7.3.1 First Stage

Once we have assumed that there is no price variation within the same cluster we can use within cluster information on expenditures and unit values to estimate the effects of household income and demographics characteristics on quantities and qualities using Ordinary Least Squares (OLS). However, if we look at equation 7.6 we can see that this equation is being estimated with cluster fixed effects by allowing dummy variables for each cluster. But the possibility of a very large number of clusters in survey data can make this very time consuming if not impossible task. One shortcut according to Firsch-Waugh (1993) theorem is to carry out estimation of equations after removing cluster means from each of the variables. Consequently, all variables in both equations can be first demeaned by their cluster means and then OLS can be

applied to the demeaned equations[125]. And the residuals from both equations i.e. e_{ic}^1 and e_{ic}^2 can be used to estimate the variances and covariance of the measurement errors in u_{ic}^1 and u_{ic}^2 in equation 7.6 and 7.7:

$$\widetilde{\sigma}^{11} = (n - C - k)^{-1} \sum_c e_{ic}^1 e_{jc}^1 \qquad 7.8$$

$$\widetilde{w}^{22} = (n_i^+ - C - k)^{-1} \sum_c e_{ic}^2 e_{jc}^2 \qquad 7.9$$

$$\widetilde{\chi}^{12} = (n_i^+ - C - k)^{-1} \sum_c e_{ic}^1 e_{jc}^2 \qquad 7.10$$

Where n is the total number of households in the survey, n_i^+ is the number of households who report purchases of good i, C is the number of clusters, and k is the number of explanatory variables. This also brings an important point home that unit value equation (7.6) is estimated only for positive market purchases, whereas β_1, which is *not* the price elasticity but a response of budget shares to change in prices as a result budget share equation (7.7), is observed for all households irrespective of whether a household makes a purchase or not .

7.3.2 Second Stage

[125] Using OLS on equations where all variables have been demeaned by their cluster means gives us correct parameters estimates that would have resulted if we had carried out estimation using dummies for each cluster in equation 7.6 and 7.7

The next stage starts with using between cluster information in the data to estimate prices responses. This is done by calculating cluster averages of "corrected" budget shares and unit values by netting out the effects of expenditures and demographic characteristics estimated in the first stage (Deaton, 1997).

$$\widetilde{y}_{ic}^{1} = \frac{1}{n_c}\sum_{i\in c}(w_{ic} - \widetilde{\beta}_1 \ln x_{ic} - \widetilde{\gamma}^{1}\ z_{ic}) \qquad 7.11$$

$$\widetilde{y}_{ic}^{2} = \frac{1}{n_{ic}^{+}}\sum_{i\in c}(\ln v_{ic} - \widetilde{\beta}_2 \ln x_{ic} - \widetilde{\gamma}^{2}\ z_{ic}) \qquad 7.12$$

Where n_c is the number of households within cluster, $n_{ic}{}^{+}$ is the number of household in a cluster that purchase good *i*. The superimposed tildes correspond to variable from the first within cluster stage. Furthermore, it must be remembered that as the sample size in the first stage of estimation increases, the estimates converge to their true values, and $\widetilde{y}_{ic}^{1}$ and $\widetilde{y}_{ic}^{2}$ also converge to true cluster means which are:

$$\hat{y}_{ic}^{1} = \alpha_1 + \sum_{H=1}^{N}\theta_{ic}\ln p_{jc} + f_c + u_{ic}^{1} \qquad 7.13$$

$$\hat{y}_{ic}^{2} = \alpha_1 + \sum_{H=1}^{N}\psi_{ic}\ln p_{jc} + u_{ic}^{2} \qquad 7.14$$

where u_{ic}^{1} and u_{ic}^{2} are the cluster means of the error terms in equation 7.7 and 7.7. Since the cluster size of household survey is typically small, normally in single digits, averaging over clusters will reduce the effect of measurement

error, but it cannot completely remove it. As a result, both the covariance and the variance must be corrected appropriately using a standard errors-in-variable estimator.

The between-village variance-covariance matrix assumes that if one were to use $\hat{y}_{ic}^{1}$ and $\hat{y}_{ic}^{2}$ to run between village OLS, the between cluster estimates of equation 7.13 and 7.14 would be:

$$B_{OLS} = S^{-1}R \qquad 7.15$$

Where the between village variance-covariance matrix of (theoretical, not estimated) $\hat{y}_{ic}^{1}$ of *S* is the $\hat{y}_{ic}^{2}$ and *R* is the covariance matrix of $\hat{y}_{ic}^{1}$ and $\hat{y}_{ic}^{2}$. According to Deaton (1997), *S* is likely to over estimate the variance-covariance matrix of actual prices because it includes the effects of measurement error in equation 7.7 and the same holds true for *R* as well. The corrected estimators can be written as:

$$\widetilde{B} = (\widetilde{S} - \widetilde{\Omega}\widetilde{N}_{+}^{-1})^{-1}(\widetilde{R} - \widetilde{X}\widetilde{N}^{-1}) \qquad 7.16$$

where $N_{+}^{-1} = p\lim C^{-1}\sum_{c} D(n_c^{+}) - 1$, $D(n_n^{+})$ is a diagonal matrix from the elements of n_n^{+}, and the matrix N^{-1} is the corresponding quantity formed from the n_c's. The matrices Ω and X are the variance covariance matrices for *u*'s from equation 7.8 - 7.10. Finally, the probability limit of the matrix B can be written as:

$$p\lim \widetilde{B} = B = (\Psi')^{-1}\Theta' \qquad 7.17$$

The matrix Θ cannot be further identified without more information. Here the information supplied by the quality theory which links price elasticity of quality to the usual price and total expenditure elasticity proposed by Deaton (1988) based on the assumption of weak separability is used to extract true matrix of price responses.

The elasticity of unit value with respect to prices ψ is one plus the elasticity of quality to price, i.e.

$$\psi_{ij} = \delta_{ij} + \beta^2 \varepsilon_{ij} / \varepsilon_i \qquad 7.18$$

Where δ_{ij} is the kronecker delta that is unity if $i = j$ and zero otherwise. β^2 is the quality elasticity from equation 7.7, ε_{ij} is the price elasticity of quantity, and ε_i is the expenditure elasticity. Where expenditure and price elasticities respectively can be computed using 7.19 and 7.20 respectively:

$$e = 1 - \beta^2 + \beta^1 D(\overline{w})^{-1} \qquad 7.19$$

$$E = -\psi + D(\overline{w})^{-1}\Theta \qquad 7.20$$

Where e is the vector of total expenditure elasticity and *E* is the matrix of price elasticities. The diagonalization operator D(.) converts its vector argument into a diagonal matrix.

7.4 The DATA

The data set that is being used for carrying out demand responses is the Household Integrated Economic Survey (HIES) (2001-02) which is also discussed in Chapter three of this study. Thus in this section only information relevant to estimation for this chapter will be discussed. As already explained HIES (2001-02) is a nationally representative survey which like other household surveys tries to minimize travel cost by selecting and interviewing households belonging to the same cluster almost at the same time. This is made possible because the size of cluster tends to be quite small; around 10-16 households in each cluster.

As a result, Deaton's (1992;1997) assumption about households facing the same set of prices within a cluster is a plausible example for households in the cluster particularly in villages where a single market exists. However, we have decided to use both urban/rural clusters for estimation of price elasticities because we believe tax policy recommendations cannot be disaggregated on the basis of urban/rural areas, thus we want to estimate elasticities that are representative of a national scenario.

Table 7.1: Cluster level Information of HIES (2001-02) Survey		
Urban	Rural	Total
471	578	1,050
Source: Author's own calculation using HIES (2001-02)		

Table 7.2 provides summary statistics for seven important food items for the households that will be used for calculation of behaviour responses at national level. These items include beef, wheat, rice, vegetable ghee, sugar, milk and pulses. The budget shares presented in Table 7.2 are also the dependent variables for first stage of estimation equation 7.6 (shares are calculated as a proportion of total household per capita expenditures). As explained in the earlier section since the intention is to calculate demand responses for the entire population, households with zero expenditure shares are also included.

Table 7.2: Summary Statistics: Dependent Variable Budget Shares

		HIES item codes	Mean	S.D
Beef	Beef	1201	0.019	0.023
Wheat	Wheat & wheat flour	2101	0.072	0.067
Rice	Rice and rice flour	2102	0.017	0.031
Vegetable Ghee	Vegetable ghee	2302	0.041	0.025
Sugar	Sugar (desi & milled)	1701	0.040	0.025
Milk	Milk (fresh & boiled)	1101	0.082	0.050
Pulses	Gram whole (black & white)	2201	0.014	0.010
	Dal chana	2202		
	Mash	2203		
	Moong	2204		
	Masoor	2205		
	Other pulses	2206		

Definition Budget Shares:

Annualized per capita expenditure on a commodity for a household *h* as a proportion of total annualized per capita expenditure for household *h*.

Source: Author's own calculation using HIES (2001-02)

According to Table 7.2 households are spending around 8.2 percent of total per capita expenditure on milk. This is followed by wheat, vegetable ghee, sugar, beef, rice and pulses, each having an expenditure share of 7.2, 4.1, 4.0, 1.9, 1.7 and 1.4 respectively.

Table 7.3 on the other hand, includes information on the explanatory variables used in equation 7.6 and 7.7. These include log of household per capita expenditure, demographic variables that include log of household size and thirteen age to household size ratios, three dummies for seasonality (based on

household interview date) and three dummies for geographic locations (based on household provincial location).

Table 7.3: Summary Statistics: Explanatory Variables

	Mean	S.D
Expenditure Variables		
Log of per capita total expenditure	9.27	0.57
Demographic Variables		
Log of household size	1.85	0.52
Ratio of male members less than 11 years of age to household size	0.16	0.16
Ratio of male members less than 11-20 years of age to household size	0.12	0.14
Ratio of male members less than 21-30 years of age to household size	0.08	0.13
Ratio of male members less than 31-40 years of age to household size	0.06	0.10
Ratio of male members less than 41-50 years of age to household size	0.04	0.08
Ratio of male members less than 51+ years of age to household size	0.06	0.11
Ratio of female members less than 11 years of age to household size	0.15	0.15
Ratio of female members less than 11-20 years of age to household size	0.11	0.13
Ratio of female members less than 21-30 years of age to household size	0.08	0.11
Ratio of female members less than 31-40 years of age to household size	0.05	0.08
Ratio of female members less than 41-50 years of age to household size	0.04	0.08
Ratio of female members less than 51+ years of age to household size (omitted)	0.06	0.11
Seasonality		
Dummy for HH interviewed in 1st quarter		
Dummy for HH interviewed in 2nd quarter		
Dummy for HH interviewed in 3rd quarter		
Dummy for HH interviewed in 4th quarter (omitted)		
Geographic		
Dummy for province Punjab		
Dummy for province Sindh		
Dummy for province NWFP		
Dummy for province Balochistan (omitted)		

Source: Author's own calculation using HIES (2001-02)

Table 7.4 presents the summary statistics for unit values that will also be used as dependent variable in equation 7.7.

Table 7.4: Summary Statistics: Unit Values for food items

Item (units)	% of HH reporting	Mean	S.D
Beef (kg)	59.0%	56.29	9.09
Wheat (kg)	72.5%	9.47	1.53
Rice (kg)	76.1%	19.45	4.67
Vegetable Ghee (litre)	87.9%	49.87	6.87
Sugar (kg)	96.7%	26.21	2.34
Milk (litre)	59.4%	16.26	4.08
Pulses (kg)	95.8%	95.17	48.43

Definition unit values:

Diving reported expenditure by reported quantities for each commodity purchased by each household. However, unit values are calculated only from paid or formal market transactions.

Note: kg means kilogram.

Source: Author's own calculation using HIES (2001-02)

As already explained, unit values, ratio of expenditure to quantity, are calculated for those households that report some expenditure on that item. By looking at above Table we can see that the highest percentage of households report unit value for sugar (97 percent) while lowest number of households report expenditure on both beef and milk each at 59 percent. The second column reports the unit values of these food items and according to this Table

on average households paid PRs. 56 for each kg of beef while per kg wheat cost was around PRs. 10.

Since demand analysis is primarily concerned with spatial price variation in the unit values, it is a worthy exercise to look at the behaviour of unit values in a bit of detail before we embark on our formal analysis (and result of this is presented in Table 7.5). Table 7.5 provides a way of looking at the spatial price variation in the unit values. It reports two different sets of calculation for Pakistani data. The top panel represents the logarithm of unit values regressed against a set of dummies for each of the four provinces; Punjab, Sindh and NWFP, (Balochistan is the omitted category) and for each of the four quarters (omitting the fourth) of the calendar year during which the survey was conducted. The intention is to capture broad provincial and seasonal patterns. The bottom portion of the table looks at variation from cluster to cluster within each province, and uses analysis of variation to decompose price variation into its within- cluster and between cluster components.

The top panel of Table 7.5 shows that in most cases (except wheat and sugar) inter-provincial price variations are much larger than the seasonal differences (although none appear to be statistically significant). We can see that in 2001-02 among provinces, wheat was relatively cheaper in Punjab, while rice appeared to be relatively cheaper in Sindh (this is in line with the fact that most of the production of wheat takes place in Punjab while most of production of rice takes place in Sindh). Sugar appears to be cheapest in Balochistan (the omitted province), while milk appears to be cheapest in Punjab. There appears to be a great deal of price variation across provinces for all commodities (except for wheat and sugar).

The bottom part of Table 7.5 reports not parameter estimates but the F-test and R^2- statistics for a regression of the logarithm of unit value on dummies for

clusters, of which there are 458 in Punjab, 264 in Sindh, 188 in NWFP and 140 in Balochistan. However, it must be kept in mind that not all clusters will appear in each regression since if no household in a cluster reports that type of expenditure, that cluster is not selected. What we are aiming to look for from this regression is how informative unit values are about prices. Since prices are assumed not to vary by much within-cluster over a short period of time, F-statistics should be significant for cluster effects at conventional level of significance, or in other words the cluster effects should explain around a half of the total variance.

According to our results, all F-Statistics appear to be quite large and significant by conventional standard. However, given that the sample size is quite large, a better indication of the strength of inter-cluster variation in unit values is typically whether the F-Statistics are larger than the logarithm of the sample sizes (Schwarz, 1978). Most of F-Statistics (identified as bold figures) meet even this stringent requirement. Thus, this should justify the assumption that there is spatial price variation and that the variation in unit values provides a (noisy) guide to it.

Table 7.5: Price variation by Province and Quarters: Pakistan (2001-02)

	Wheat		Beef		Rice		Veg. ghee		Sugar		Milk		Pulses	
	Coeff	***t***	**Coeff**	***t***	**Coeff**	***t***	**Coeff**	***t***	**Coeff**	***t***	**Coeff**	***t***	**Coeff**	***t***
	(2001 - 02)													
Regression														
Punjab	-1.43	*-37.1*	-7.43	*-32.4*	-1.46	*-11.1*	-7.11	*-41.4*	0.45	*7.5*	-5.06	*-42.0*	21.30	*18.1*
Sindh	0.44	*10.4*	3.80	*15.8*	-3.35	*-23.1*	-7.13	*-37.8*	0.93	*14.4*	-2.20	*-16.6*	-14.77	*-11.5*
NWFP	-0.59	*-13.5*	-10.62	*-43.3*	-2.73	*-18.2*	-9.68	*-49.2*	1.18	*16.8*	-0.18	*-1.3*	-19.25	*-14.0*
Quarter 1	0.17	*4.0*	1.02	*4.1*	0.01	*0.1*	0.15	*0.9*	0.41	*6.6*	-0.30	*-2.5*	0.60	*0.5*
Quarter 2	0.05	*1.5*	1.24	*5.7*	0.27	*2.2*	-0.12	*-0.8*	0.24	*4.4*	-0.20	*-1.9*	1.49	*1.4*
Quarter 3	-0.09	*-2.5*	0.21	*1.0*	0.16	*1.3*	0.17	*1.1*	0.02	*0.4*	0.02	*0.2*	0.91	*0.8*
Analysis of variance	**F**	**R^2**	**F**	**R^2**	**F**	**R^2**	**F**	**R^2**	**F**	**R^2**	**F**	**R^2**	**F**	**R^2**
Punjab	3.92	*0.32*	4.3	*0.45*	6.11	*0.40*	**11.64**	*0.51*	**22.12**	*0.64*	**21.98**	*0.73*	5.16	*0.30*
Sindh	**17.39**	*0.65*	**17.7**	*0.67*	**15.47**	*0.62*	**15.01**	*0.57*	**35.84**	*0.73*	**70.39**	*0.90*	**13.18**	*0.50*
NWFP	**10.66**	*0.50*	4.92	*0.33*	6.48	*0.37*	**10.07**	*0.45*	**45.59**	*0.79*	**14.05**	*0.64*	**8.05**	*0.39*
Balochistan	**30.56**	*0.55*	**16.5**	*0.62*	6.86	*0.38*	**8.90**	*0.43*	**34.34**	*0.71*	**25.64**	*0.77*	**11.63**	*0.46*

Note 1/: Regressions of unit values on provincial and seasonal dummies, ANOVA by clusters. 2/Bold F-Statistics values in Table represents those that satisfy Schwartz (1978) criterion. The number of observation in each regression of analysis of variance is the number of households that report a market purchase of an item.

Source: Author's own calculation using HIES (2001-02)

7.5 Estimation

7.5.1 First-stage estimates

After a detailed basic discussion regarding variables that will be used in this estimation and after confirming that the unit values (at least in the case of seven goods above) are providing significant inter-cluster variation (significant enough in most cases to meet stringent (Schwarz, 1978) criteria); as a result, we are in a good position to start discussion of our estimation.

Table 7.6 presents within cluster estimates of regression for (log) unit values and expenditure shares i.e. equation 7.6 and 7.7. As explained before, all variables in both equations were first demeaned by their cluster means and then OLS was applied to the demeaned equations. OLS regressions at this stage are run using demeaned values of each variable in the regression and result of key variables is presented in Table 7.6 (for complete estimation results please see Appendix 7.1 attached at the end of this chapter)

Note that the estimates in Table 7.6 are final estimates for the effects of total expenditure and demographic variables derived completely from *within* cluster information. The first and fourth line represent our β^1 and β^2 coefficient respectively from equation 7.6 and 7.7. According to our estimates, all coefficients of total (per capita) household expenditures (*w:lnx*) appear to be statistically significant and with right sign (except milk). The total expenditure elasticity for wheat appears to be 0.157, for rice it is 0.518, vegetable ghee 0.41, sugar 0.64, milk 1.01, pulses 0.28 and beef 0.77. Since only milk appears to have expenditure elasticity greater than unity, it appears to be a luxury item

while all other items with expenditure elasticities less than unity are necessities.

Furthermore, the coefficients of household size (w:lnhhs) in all cases (except milk) appeared to be statistically significant and the sign of the coefficients is the same as the coefficients on total expenditure. This implies that increasing household size (with household composition being held constant) would increase the household expenditure and vice versa.

The quality elasticities estimates (v:ln$x$) are presented in the fourth line of Table 7.6 with subsequent coefficient for household composition effects (v:lnhhs) in the next line. The quality elasticity estimates for rice, vegetable ghee, milk and pulses appeared to be statistically significant while those for wheat, sugar and beef are not. The unit value of rice, vegetable ghee, milk and pulses increases with expenditure, with elasticities of 0.13, 0.017, 0.019 and 0.21 respectively. The unit values coefficient in most cases as expected are quite small. Additionally, household size effects in most cases (except sugar and beef) are statistically significant. Also, the sign of the coefficient of household size in the unit value equation (v:lnhhs) is the same as the sign of coefficients on total expenditures. Thus, the household size effect in all cases (holding composition constant) reinforces the changes in unit values via expenditures.

Table 7.6: Income and Household Size Coefficients in Share and Unit Value Regression (within Cluster estimates)

	Beef	t-value	**Wheat**	t-value	**Rice**	t-value	**Veg. Ghee**	t-value	**Sugar**	t-value	**Milk**	t-value	**Pulses**	t-value
w: lnx	-0.004	*9.7*	-0.061	*49.3*	-0.006	*10.25*	-0.024	*51.34*	-0.014	*32.82*	0.003	*2.39*	-0.007	*37.3*
w: lnhhs	-0.001	*2.73*	-0.016	*13.79*	-0.002	*3.83*	-0.009	*20.31*	-0.006	*14.36*	0.001	*1.06*	-0.003	*15.43*
elasticity w.r.t. x	0.777		0.157		0.518		0.406		0.640		1.012		0.284	
ln v: lnx	0.002	*0.62*	-0.003	*1.05*	0.131	*30.76*	0.017	*7.51*	-0.001	*0.91*	0.019	*5.6*	0.217	*20.97*
lnv:lnhhs	0.001	*0.61*	-0.015	*4.87*	0.057	*14*	0.006	*3.03*	-0.001	*0.59*	0.015	*4.51*	0.232	*23.99*

Note: where w is the budget share, lnv the unit value, x total per capita expenditure, and hhs household size. This implies w :ln$x$ is the regression coefficient for w on ln$x$, and w :lnhhs is the regression coefficient for w on lnhhs . The elasticity in row 3 is the total expenditure elasticity for that good calculated using the formula $1-\beta_i^1+\beta_i^2 w_i^{-1}$. Absloute t-values are given in

Source: Author's calculations using Household Income and Expenditure Survey, (2001-02)

7.5.2 Price response: Second-stage estimates

Table 7.7 present own- and cross-price elasticities results for Pakistan along with the bootstrapped estimates for "standard errors". The numbers are presented such that the elasticity estimate in row *i* and column *j* is the response of consumption of good *i* to the price of good *j* . These estimates include the provincial and quarter effects in demands as these are allowed for by regressing the corrected cluster averages of budget shares and unit values on quarterly and provincial dummies.

According to our results in Table 7.7 we can see that all own- price elasticity estimates are negative (except for wheat) and significant[126]. The own- price elasticity for beef, rice and milk is less than -1. This means milk, rice and beef are price elastic goods while demand for vegetable ghee, sugar, and pulses is fairly inelastic. This provides very useful information from the tax policy planning perspective. For instance, additional price increase of milk, rice and beef (due to imposition of tax for instance) is going to be not that successful because demand for these products is quite elastic. Thus, it is unlikely that much revenue is going to be raised from such a policy. On the other hand, vegetable ghee, sugar and pulses are an attractive candidate for further price increase (due to a tax) since their demand is fairly inelastic. Thus, these elasticities estimates are fundamental for tax policy planning as they make *ex-ante* tax policy analysis possible.

[126] It is hard to explain a positive own-price elasticity case, such as wheat, in our case. One possibility is that the estimation is severely affected by aggregation across various qualities of wheat in the survey..

Table 7.7: Estimates of Own- and Cross- Price Elasticities (2001-02)

	Beef		Wheat		Rice		Veg_ghee		Sugar		Milk		Pulses	
Beef	**-1.843**	(0.28)	**0.581**	(0.09)	**0.695**	(0.26)	**-0.931**	(0.098)	**-0.585**	(0.10)	**0.547**	(0.03)	-0.161	(0.127)
Wheat	**-0.586**	(0.28)	**0.364**	(0.18)	0.248	(0.42)	**0.534**	(0.15)	**-0.835**	(0.167)	**0.577**	(0.056)	0.023	(0.28)
Rice	**-1.750**	(0.19)	**2.533**	(0.10)	**-1.306**	(0.31)	0.070	(0.079)	**0.590**	(0.095)	**-0.221**	(0.043)	**-0.703**	(0.16)
Veg_ghee	-0.007	(0.18)	0.000	(0.089)	0.132	(0.196)	**-0.304**	(0.11)	0.089	(0.082)	**-0.212**	(0.026)	0.049	(0.10)
Sugar	**-0.530**	(0.17)	**-0.589**	(0.09)	0.092	(0.22)	**1.170**	(0.077)	**-0.380**	(0.129)	**-0.252**	(0.027)	-0.070	(0.13)
Milk	**-0.385**	(0.14)	-0.012	(0.086)	**-0.635**	(0.28)	**0.159**	(0.066)	0.052	(0.075)	**-1.144**	(0.043)	0.030	(0.16)
Pulses	**-0.157**	(0.078)	-0.059	(0.055)	0.132	(0.126)	**0.316**	(0.03)	**0.427**	(0.046)	**0.081**	(0.02)	**-0.451**	(0.05)

Source : Author's calculation using Household Income and Expenditure Survey, (2001-02).

Note 1/: The row shows the commodity being affected and the column the commodity whose price is changing. Bootstrapping standard errors are reported in parentheses and they are computed from 1,000 replication of the bootstrap using cluster specific information and are defined as half of the length of the interval around the bootstrap mean that contains 0.638 (the fraction of a normal random variable within two standard deviations of the mean) of the bootstrap replication [for example see Deaton (1997, p.71)].

2/ Figures in bold are greater in absloute value than twice their size of bootstrapped standard error (5% level of significance).

Table 7.7 also presents cross- price elasticity results for all seven goods. Almost around half of our cross- price elasticity estimates appear to be significant and in some cases the cross- price elasticities estimates are not too small to ignore. For instance, one percent increase in the price of beef decreases the demand for rice by 1.7 percent. In quite a few cases we are able to make out a clear relationship pattern between goods but very few of these are also statistically significant. For instance, beef appears to be a complement to vegetable ghee, sugar and pulses (but only in the case of sugar is this relationship statistically significant). The complement relationship between beef and sugar warrant extra comment. One possibility is that given beef is an expansive meat type, it is normally cooked by average Pakistani households on special occasions and a dessert is also part of the menu of such events. This can explain a positive relationship between beef and sugar. Wheat, on the other hand, appears to be a substitute for rice and vegetable ghee but a complement to sugar (but only in the case of sugar is this relationship also statistically significant). Similarly, rice appears to be a substitute of vegetable ghee and sugar but a complement to milk while vegetable ghee appears to be a substitute to sugar and pulses (but none of these relationships are significant). Lastly, milk and pulses appear to be complements (but this relationship is not statistically significant). Thus, these results show important differences from results obtained by imposing symmetry.

The results presented in Table 7.7 highlight an important point. In the case of developing countries where data availability is limited to one year cross-sectional data, model based on additive preferences such as linear expenditure system (LES) that restricts cross- price elasticities to be small and enforces approximate proportionality, are generously used (for instance see Ahmad and Stern (1986) for Pakistan). According to Deaton (1987) models that assume additive preferences (such as LES system), tax reform prescriptions tend to be

quite simple and he concludes "under these assumptions, empirical analysis is unnecessary, since the answer is predetermined" (pp.6). This is supported by our findings since we do not find any such proportionality between expenditure elasticities and price elasticities[127]. For instance, first we do not find cross-price elasticities to be too small to be negligible (i.e. fundamental assumption underlying most of optimal taxation literature) and second, if we look at Table 7.6 expenditure elasticities show all items except milk to be necessities while according to own- price elasticities estimates in Table 7.7, demand for beef, rice and milk appears to be quite price elastic while demand for wheat, vegetable ghee, sugar, and pulses appears to be price inelastic. Thus, this really questions whether predictions of a system such as LES are really meaningful for tax and price reform analysis.

Table 7.8 presents our own price elasticity results with Deaton and Grimard results using the same methodology but for a different time period. We do not expect results to completely match with Deaton & Grimard (1992) own-price elasticities for three reasons: (a) Difference in time period (almost 15 years); (b) The definition (see third column) of only sugar, rice and wheat is directly comparable to ours otherwise Deaton and Grimard (1992) use broader aggregation of commodities; (c) Our results are for national level (as flagged earlier)[128].

[127] This finding is supported by Deaton and Grimard (1992) and Deaton (1997).

[128] Please see Appendix 7.2 for rural elasticities estimates for (2001-02).

Table 7.8: Comparison of Own Price Elasticities Results[129]				
Our Categories	**Our Results / 1 (2001-02)**	**Deaton & Grimard Categories**	**Deaton & Grimard Results 2/ (1984-85)**	
	All Pakistan		**Rural**	**Urban**
Beef	-1.84	**Meat** Beef Mutton Chicken meat	-0.57	-0.33
Wheat	0.36	**Wheat**	-0.51	-0.86
Rice	-1.30	**Rice**	-1.59	-1.83
Vegetable Ghee	-0.304	**Oils & fats** Desi ghee(butter oil) Vegetable Ghee Cooking oils Other oils & fats	-2.04	-1.17
Sugar	-0.380	**Sugar**	-0.07	-0.81
Milk	-1.14	**Dairy** Milk (fresh & boiled) Lassi (buttermilk) Milk (packed) & (powdered for adults and children) Butter, Margarine, Cream Cheese Curd/Yogurt Ice cream, Kulfi Others	-0.87	-1.10
Pulses	-0.45			
Source: 1/ Author's own calculation from HIES (2001-02) 2/ Table 5, LSMS Working Paper no. 85, Demand Analysis and Tax Reform in Pakistan, 1992				

In the case of homogenous goods and where the good aggregation level is the same as used by Deaton and Grimard (1992), for instance sugar and rice, the results over time have not changed much (as one would expect). For instance, sugar according to both sets of result appears to be price inelastic, while rice appears to be a price elastic good. Milk according to our and Deaton & Grimard urban estimates, appears to be price elastic. This gives us further confidence in our results and recommendations (discussed ahead).

[129] Own price elasticities for rural area in Pakistan (2001-02) are presented in Appendix 7.2. None of own price elasticity estimates are drastically different from national level results.

7.6 Demand Responses and Our Incidence Findings

In this section we will try to illustrate how price elasticities estimated in the previous section are likely to impact our incidence findings reported in the earlier chapters. This is quite important as it is one of the fundamental criticisms faced by partial equilibrium tax incidence model.

Let's assume there is an x percentage point increase in the price of sugar (for instance GST on sugar is increased). This means according to our elasticity estimates, demand for sugar will fall by $0.38x$ percent. As demand for sugar is fairly price inelastic, Government revenue should increase from this policy. As sugar is consumed more by the poor in both the rural and urban areas, this is likely to impact the poor more. However, due to fairly inelastic demand patterns incidence is likely to remain very close to the one predicted earlier (because partial equilibrium tax incidence analysis already assumes no demand response).

However, an x percentage increase in the price of sugar due to GST does not only affect sugar consumption, but also affects demand for other commodities *via* significant cross- price effects. Thus, demand for beef and wheat will fall, while the demand for rice, vegetable ghee, milk and pulses will increase. As a result Government revenue will fall on account of decrease in demand for beef, and wheat but increase due to increase in demand for other goods (assuming all these goods were already being taxed). However, it appears a fall in demand on aggregate will slightly dominate the increase in demand, given our cross- price elasticities estimates. Thus on this account, overall Government revenue will fall. Since large cross price effects are for beef (demand falls), wheat (demand falls) and rice (demand increases), poor who

largely consume wheat will experience some relief but this to some extent will be offset by increase in demand for rice. Thus, at the end the overall incidence picture may not change much. More importantly, price of sugar that was mainly increased to raise additional revenue, may not result in much additional revenues.

Let's consider another example, vegetable ghee. For an *x* percentage point increase in price of vegetable ghee given its demand is fairly inelastic (with own- price elasticity similar to that of sugar) demand for vegetable ghee will not fall by that much. Thus, Government should be able to raise revenue from this policy but it is likely to impact the poor more as they spend relatively more on this item. However, in this case if we look at cross- price effects things appear to be quite different compared to our earlier *illustration*. For instance, demand for sugar and wheat will increase (and also milk and pulses but to a lesser extent) while demand for beef declines quite sharply. However, in this case the cross- price effects do not balance out neatly as before. Thus, as a result of this policy Government will be able to raise revenue but likely large distributional effects will be borne by the poor who are spending more on vegetable ghee, sugar and wheat.

Thus it appears for our selected sample of commodities, incidence patterns while allowing for the own- price elasticities do not alter dramatically. However, effect of incorporation of cross- price elasticities varies from case to case basis depending on the magnitude and sign of the elasticity and the importance of the other commodities in the consumption basket; sometimes (as per our illustration) it makes little difference, in other cases it might matter more. However, generally it appears that incorporation of own- and cross-price effects while making possibly bigger impact on incidence, may still not alter our results that dramatically. Nevertheless, we cannot generalize these results to commodities outside our sample or for other countries or for a

different time period. As in other cases inclusion of cross-price effects may prove more important for policy purposes.

7.7 Tax and Price Reform

Now we are in a position to begin with the last section of our chapter, that is carrying out microsimulation analysis using elasticities estimates calculated in the previous section. We feel it is necessary to incorporate this section because in chapters five and six, we were able to show the social incidence of indirect taxation at pre- and post reform scenarios but we were not able to give any specific recommendation that at the margin can improve the welfare of households particularly from the point of view of post-reform position. This section gives us an opportunity to point out future reforms that will be welfare-enhancing at margin (as a consequence completing our discussion in earlier chapters).

This section will use the theory of marginal tax reform (MTR) (as explained earlier in chapter three) developed by the seminal work of Ahmad and Stern (1984). The aim of this theory is to measure welfare gains due to small changes in tax rates of every good. Essential to this approach is that the current system must be taken as given and the aim is to identify directions of tax reform that at the margin are welfare enhancing (Madden, 1995). The importance of MTR theory lies in the fact that this approach attempts to calculate the directions of welfare improving reform at margin from the existing position of the economy, which according to Madden (1995) and Deaton (1995), is not only more appealing for the policy makers but also a more practical approach.

We can write the indirect social welfare function consisting of *N* households as:

$$W = V(u_1, u_2, ...u_N) \qquad 7.21$$

$$u_h = \psi(x_h, p) \qquad 7.22$$

It is possible to determine the effect of tax reform on social welfare *W* through a movement in the prices of goods which using the chain rule can be obtained by differentiating equation 7.21 with respect to the tax change.

$$\frac{\partial W}{\partial t_i} = \sum_{h=1}^{H} \frac{\partial V}{\partial u_h} \frac{\partial u_h}{\partial p_i} \qquad 7.23$$

which using Roy's identity ($\partial u_h / \partial p_i \,/\, \partial u_h / \partial x_h = -q_{ih}$) can be written as:

$$\frac{\partial W}{\partial t_i} = -\sum_{h=1}^{H} \eta_h q_{ih} \qquad 7.24$$

which shows the welfare effect of a tax-induced marginal price change that is given by the sum of each household's consumption of good i. Where q_{ih} is the

quantity of good *i* consumed by household *h*, and η_h is the social marginal utility of money which is equal to:

$$\eta_h = \frac{\partial V}{\partial u_i}\frac{\partial \Psi_h}{\partial x_h} = \frac{\partial W}{\partial x_i} \qquad 7.25$$

Since the household social welfare along with household expenditure is also determined by the Government public expenditures, which is a function of taxes, government revenues is the sum of all the tax payments and subsidy cost:

$$R = \sum_{i=1}^{M}\sum_{h=1}^{H} t_i q_{ih} \qquad 7.26$$

Thus, a small change in tax (or subsidy) will have an effect on Government revenue R and the corresponding level of individual welfare. If we take the differential of equation 7.26 with respect to tax change we get the redistributive effect of tax reform:

$$\frac{\partial R}{\partial t_i} = \sum_{i=1}^{M} q_{ih} + \sum_{h=1}^{H}\sum_{i=1}^{M} t_i \frac{\partial q_{ih}}{\partial p_i} \qquad 7.27$$

If we assume consumer prices are determined by world prices, p_i^0 [130], then tax or a subsidy can be written as $p_i = p_i^0 + t_i$, and the household budget constraint can be written as:

$$x_h = \sum_{i=1}^{M} (p_i^0 + t_i) q_{hi} \qquad 7.28$$

Since total expenditure of each household is not affected by tax increase, if we differentiate equation 7.26 with respect to tax change while holding world prices fixed, we get:

$$\sum_{i=1}^{M} q_{ih} + \sum_{h=1}^{H} \sum_{i=1}^{M} t_i \frac{\partial q_{ih}}{\partial p_i} = -\sum_{i=1}^{M} p_i^0 \frac{\partial q_{ih}}{\partial p_i} \qquad 7.29$$

This is also the social benefit of raising one additional rupee for Government's revenue. Thus, the social benefit of raising one additional rupee as Government revenue (equation 7.29) and the cost of raising this revenue (equation 7.24) can be given by a ratio as follows:

$$\lambda_i = \frac{Cost}{Benefit} = \frac{\sum_{h=1}^{H} \eta_h q_{ih}}{\sum_{h=1}^{H} q_{ih} + \sum_{h=1}^{H} \sum_{j=1}^{M} t_j \frac{\partial q_{jh}}{\partial p_i}} \qquad 7.30$$

[130] Needless to say this is a heroic assumption since it assumes that all goods are tradable.

The numerator of equation 7.30 represents the social cost of raising one rupee of additional revenue by increasing the tax on good *i* while the denominator represents the social benefit of raising an additional rupee in terms of extra revenue. If λ_i is large, social welfare will be increased by reducing tax on good *i* because this tax is taxing those who have higher weights in the social welfare function or because it is distortionary, or both. If λ_i is low, goods with low λ_i are better candidates for tax increase. In case when all λ_i's are equal, taxes are optimally set; hence, there is no beneficial reforms.

It is possible to rewrite equation 7.30 in a form that allows us substantial generalization that takes account of both quality and quantity responses to price change. This can be done by writing:

$$\lambda_i = \frac{w_i^{\varepsilon} / \widetilde{w}_i}{1 + \frac{\tau_i}{1+\tau_i}\left(\frac{\theta_{ii}}{\widetilde{w}_i} - 1\right) + \sum_{k \neq i} \frac{\tau_k}{1+\tau_k} \frac{\theta_{ki}}{\widetilde{w}_i}} \qquad 7.31$$

Where $\widetilde{w}_i$ can be defined as the "plutocratic" average budget share which can be written as

$$\widetilde{w}_i = \sum_{h=1}^{H} x_h w_{ih} / \sum_{h=1}^{H} x_h \qquad 7.32$$

Where x_h is the expenditure of household *h* and w_{ih} is the share of good *i* within household *h* budget.

w_i^{ε} ,on the other hand, can be defined as the "socially representative budget share" which can be written as

$$w_i^{\varepsilon} = [\sum_{h=1}^{H} (x_h / n_h)^{-\varepsilon} x_h w_{ih}] / \sum_{h=1}^{H} x_h \qquad 7.33$$

Where $(x_h / n_h)^{-\varepsilon}$ is the standard Atkinson social welfare function.

Now the numerator of equation 7.31 can be taken as a pure distributional measure of good *i*. It can be interpreted as the relative shares of the market representative individual and the socially representative individual, whose income is lower the higher the inequality aversion parameter.

The first part in the denominator (in addition to 1) is the tax factor multiplied by the income elasticity of good *i* with respect to price, quality and quantity effects taken together. This term can also be thought of as one that measures own- price distortionary affect of the tax. If this term is large (and negative), that means it will result in a corresponding large λ_i (given other things are constant), implying a high cost attached with raising further revenue from taxes from this good and vice versa. The last term in the denominator is the sum of the tax factors multiplied by the cross price elasticities. This terms captures the effects of how change in the tax on good *i* affects other goods, including quantity and quality effects.

7.7.1 The Analysis of Tax and Price Reform

If we look at equation 7.31 we can see that the implementation of the tax reform formula requires most of the information which we now have available to us. This includes information on consumption of various items, price

derivates, social weights and shadow prices. We have just estimated price derivates (own and cross). Assigning social weights is a fairly common practice; as a result we are left with the issue of clarifying how *shadow prices* or *shadow tax (subsidy) rate* τ_i can be determined. The shadow prices represent the element of tax (or subsidy) in percentage terms that each good is subject to. Ideally, this price should be set by taking into account tariffs, taxes, subsidies and other transfers; all of which contribute to the determination of domestic price of a good (Deaton, 1997). However, like Deaton (1997), we work with an *illustrative* set of shadow prices in order to keep this discussion simple. This price set is termed *illustrative* since it does not claim to incorporate all the ingredients that should ideally be included for a *shadow price* but nevertheless it is simple, transparent and comprehensive enough to include Pakistan's actual post reform situation, that should be enough to ascertain direction of welfare improving reforms[131] [132].

Most of the information required for the calculation of an *illustrative* set of shadow prices (tax or subsidy) is taken from World Bank (2007). According to this report most of major agriculture commodities during the 1980s were heavily implicitly taxed through negative indirect effects of trade and exchange rate policies. However, by the end of the 1980's there was a significant decline in the distortion of agriculture prices as a result of major trade and agriculture price reform policies undertaken by the Government (World Bank, 2007). This information is presented in Table 7.9 which shows

[131] The experiment that is being considered here is an increase or decrease in the consumer price of a good as a result of a consumption tax like VAT or tariff. This experiment would not correspond well with analysis of export taxes because such a tax according to our model will increase consumer welfare as well as Government revenue at the same time, which according to our specification requires this tax to be increased indefinitely. Additionally, since export taxes can alter both the consumer as well as producer prices, it can not be fully analyzed without bring supply responses in the picture (Deaton, 1997).

[132] Also, this experiment only looks at the demand side of analysis where its assumed producer and consumer prices are separated (Deaton, 1997).

a nominal rate of protection for the major agriculture commodities during the last three decades.

Table 7.9: Nominal Rate of price distortions in Pakistan's Agriculture

	Total Effect		
	1981-90	**1991-00**	**2001-05**
Wheat	-0.28	-0.19	-0.15
Basmati Paddy	-0.65	-0.39	-0.39
IRRI Paddy	-0.38	-0.29	-0.08
Sugar	0.83	0.65	0.88
Vegetable Oil	-0.08	0.25	0.24

Source: (Selected Excerpts from) Table 3.9, 'Nominal Rates of Assistance for Selected Agricultural Products in Pakistan', in Pakistan Promoting Rural Growth and Poverty Reduction, World Bank Report # 39303-PK. A negative sign here means domestic prices being kept below the border prices (thus a subsidy for domestic consumers) and a positive sign means domestic prices being kept higher than the border prices (henceforth a tax on domestic consumers).
Note 1: Direct trade and pricing policy distortions are measured by nominal rates of protection using official exchange rates.
Note 2: Paddy, Sugar and vegetable oil nominal rates of protection are calculated at the wholesale market level. Sugar cane is calculated at mill gate. All other rates are calculated at farm gate.

By looking at Table 7.9 we can get some idea of level of price distortion in Pakistan over time. According to 2001-05 estimates (which are most relevant to us for future policy forecast) the border price of wheat was 15 percent above the domestic price, while border price for basmati rice was 39 percent more than domestic price and border price for IRRI rice was only 8 percent above the domestic rice price. Both are tradable goods; for wheat I work with accounting ratio (shadow prices divided by consumer prices[133]) of 1.15 and

[133] Accounting ratios are defined as shadow prices divided by consumer prices where latter is taken as one (Ehtisham and Stern, 1990).

1.17[134]. In the case of sugar, domestic industry is heavily protected; in this case border price of refined sugar is some 88 percent of the domestic price. Thus, in this case the accounting ratio will be 0.88. Additionally, vegetable oil border price appears to be some 24 percent of the domestic price. Thus, the accounting ratio for vegetable ghee is 0.24. For other items (mainly non-traded) I work with an accounting ratio of 1. This information is sufficient to build accounting ratios (shadow prices divided by consumer prices) for seven goods namely beef, wheat, rice, vegetable oil, sugar, milk, and pulses as (1.0, 1.15, 1.17, 0.24, 0.88, 1.0, 1.0).

7.7.2 Efficiency Effect

Results for the efficiency aspect of tax reform in Pakistan for (2001-02) are presented in Table 7.10a which also presents the denominator of equation 7.33. The first column of Table 7.10a presents a shadow tax factor; $\tau_i/(1+\tau_i)$, calculated from accounting ratios discussed in the previous section. This shadow tax factor, according Ahmad and Stern (1990) is the difference between consumer prices and shadow prices expressed as a proportion of consumer prices, taken to be one here. The second column represents own price elasticities of quantity into quality and reflect own-good contribution to the tax distortion. The third column shows own-price distortion effect and this is zero in the cases where there is no shadow tax factor on the good, thus no distortionary affect due to a change in its own price due to a tax. The fourth column contains cross effects where a negative term implies a higher distortionary cost of raising extra rupee revenue from a tax on these

[134] Accounting ratio for rice is estimated using weights equivalent to domestic consumption of various varieties of rice. These weights are taken to be 30 percent for Basmati (which is mostly export quality rice) and 70 percent for IRRI Paddy rice within the total domestic rice consumption.

goods. The last column reflects the total effect or the denominator of equation 7.30.

According to our estimates for total effect, as far as efficiency is concerned, rice is one prime candidate for price increase; its subsidy is distortionary and should be removed. Moreover, vegetable ghee and sugar are also prime candidates for further price increase. By contrast wheat, beef and milk appear to be prime candidates for price decrease.

Table 7.10 a: Efficiency aspects of price reform in Pakistan (2001-02)

	$\frac{\tau_i}{1+\tau_i}$	$\frac{\theta_i}{w_i}-1$	***Own effect***	***Cross effect***	***Total***
			(2001-02)		
Beef	0.00	-1.95	0.00	-0.41	0.59
Wheat	-0.15	0.84	-0.13	-0.53	0.35
Rice	-0.17	-1.37	0.23	0.17	1.41
Veg_ghee	0.76	-0.69	-0.02	1.13	2.11
Sugar	0.12	-0.22	-0.20	0.25	1.05
Milk	0.00	-1.16	0.00	-0.22	0.78
Pulses	0.00	-0.34	0.00	-0.03	0.97

Note: This estimation is based on Equation 7.33. The *own effect* column is the product of column 1 and column 2; *cross* effect column is the last term in denominator of Equation 7.33 ; column *total* is 1 plus *own effect* and cross *effect* column.
Source: Author's own calculation using HIES (2001-02).

7.7.3 Equity Effect and cost-benefit ratio for price increase in Pakistan

The equity effects of price and tax reform in Pakistan are presented in Table 7.10b along with the cost benefit ratio of raising an extra rupee by increasing the price of a good. The first two columns of Table 7.10b shows the equity effect of price reform when there are no distributional concerns (i.e. $\varepsilon = 0$) and

the equity effect here is simply the reciprocal of total effects in Table 7.10a as a result the outcome is also same as described in Table 7.10a.

The results show that when there are no distributional concerns that rice, vegetable ghee and sugar are prime candidates for price increase while beef, wheat, milk and pulses are not. Under low inequality aversion, ε=0.5, goods whose price should not be increased, now also include sugar. For the medium level of inequality aversion, ε=1.0, results do not change from the previous level while only in the case of a higher inequality aversion, ε=2.0, rice joins the ranks of goods whose price should not be increased for equity reasons. Thus, as we move across different equality aversion levels in Table 7.10 we can see that results in particular are not very sensitive to the level of inequality aversion used which is the usual strength of this procedure.

Thus, if we compare the efficiency and equity recommendation for inequality aversion (ε=0.5 and ε=1.0) we can see that efficiency requires price of goods such as sugar, vegetable ghee and rice should be increased. When relatively more inequality aversion is introduced i.e. using either, ε=0.5 and ε=1.0, equity still requires that not only price of wheat, meat, milk and pulses but also of sugar should not be raised. However, rice joins the rank of commodities whose price should not be increased on distributional grounds when higher (i.e. ε=2.0) inequality aversion is used.

Thus, our finding suggest that raising revenue from an increase in the price of rice and vegetable ghee would be desirable from both an efficiency and equity considerations (except for higher inequality aversion i.e. ε=2.0 for rice). However, raising revenue by increasing price of sugar is desirable on efficiency grounds but undesirable on equity grounds (even with low inequality aversion). We can further extrapolate these results to VAT future recommendation since such experiment of price increase is clearly in line with

the imposition and extension of a tax like VAT. It appears that basic goods such as beef, wheat, milk and pulses should remain exempt as it is in line with efficiency as well as equity considerations; sugar should be exempt (which is currently taxed) if equity considerations are held more important than efficiency considerations and perhaps a bit surprisingly taxation of vegetable ghee is justified under both equity and efficiency grounds.

Table 7.10 b: Equity effect and cost-benefit ratios for price increase in Pakistan (2001-01)

	$\varepsilon = 0$		$\varepsilon = 0.5$		$\varepsilon = 1.0$		$\varepsilon = 2.0$	
	$w^{\varepsilon}/\widetilde{w}$	λ	$w^{\varepsilon}/\widetilde{w}$	λ	$w^{\varepsilon}/\widetilde{w}$	λ	$w^{\varepsilon}/\widetilde{w}$	λ
(2001-02)								
Beef	1.00	1.70	1.12	1.91	1.18	2.01	1.22	2.07
Wheat	1.00	2.88	1.24	3.58	1.40	4.05	1.58	4.57
Rice	1.00	0.71	1.19	0.84	1.30	0.93	1.43	1.02
Veg_ghee	1.00	0.47	1.21	0.58	1.35	0.64	1.53	0.72
Sugar	1.00	0.95	1.17	1.12	1.27	1.21	1.37	1.30
Milk	1.00	1.29	1.08	1.40	1.11	1.43	1.10	1.42
Pulses	1.00	1.03	1.13	1.17	1.18	1.22	1.21	1.25

Source: Author's own calculation using HIES (2001-02).

7.8 Conclusion

The aim of this chapter has been to go beyond the distributional analysis of tax incidence by estimating own- and cross- price elasticities using spatial price variation in the survey data. The intentions have been manifold: (a) to provide useful discussion on why estimates of elasticities are important for *ex-ante* tax policy planning and tax reform; (b) to illustrate how or if tax incidence estimates from earlier chapters are sensitive to demand responses; and (c) to recommend the future direction of welfare enhancing reforms for Pakistan at margin.

There is overwhelming support for the fact that robust estimation of price elasticities is pivotal for tax policy planning and reform analysis. However, empirical research in this area, particularly for developing countries to date, has been limited. This shortcoming appears to be rooted in difficulty involved with estimating price elasticities given data availability in these countries. However, this is very relevant and critical information for policy makers for carrying out successful and welfare enhancing reforms (at margin or otherwise). Thus, this is one area where despite all the problems debate needs to be taken further and here we believe this study has made a valuable attempt by estimating elasticities.

We have also tried to *illustrate* that at least in the case of Pakistan incorporating demand responses into partial equilibrium tax incidence analysis may not change results that much. However, this in our case largely hinges on the fact that for our *illustrative* case cross- price effects appear to cancel out. This should give some credibility to the earlier estimates in the previous chapters. However, it is worth nothing that in other studies the inclusion of cross- price effects may prove more important for policy purposes.

The practical appeal of the theory of marginal tax reform (MTR) in developing countries can not be exaggerated. In these countries policy makers rarely have the privilege of designing tax structure from scratch or of introducing changes in tax structure that may be too extreme. Thus, in many cases policy makers are interested in knowing empirically robust and theoretically consistent suggestions to improvement over the status quo. Our estimates show that raising further revenue (from VAT) by increasing the price of basic goods such beef, wheat, milk and pulses will not be welfare enhancing, as it is neither efficient nor equitable. On the other hand raising further revenue from taxation of sugar (which is currently being taxed) is efficient but *not* equitable.

Similarly, increasing price of rice is efficient but not equitable (for all cases of inequality aversion). Lastly, it appears only in the case of vegetable ghee there is a case of further price increase that is both equitable and efficient. This offers some lessons for future direction of VAT reforms. It appears policymakers seriously need to think about taxation of sugar (as also flagged in earlier chapters). Also, exemptions of wheat, pulses, beef, milk and rice (last under high inequality aversion) should continue. Furthermore, taxation of vegetable ghee is justified and it is an ideal candidate for future price increases.

Interestingly, the results for MTR also show that policy makers in these countries in reality face a dilemma in trying to balance equity and efficiency considerations. For instance, in many cases additional revenue can be raised from reforms that may be efficient but *not* necessary equitable. Thus, finding the right combination of reforms that are both efficient and equitable may leave policymakers with very few policy options. Thus, this perhaps highlight real problem and issues faced by policymakers when designing reforms or policy options.

In next chapter, which is also the conclusion of this study we will attempt to highlight what this study has brought in terms of its overall contribution and innovation to this research area.

CHAPTER VIII: Conclusions

8.1 Main Findings

This study aimed at measuring the social incidence of indirect taxes in Pakistan as a result of the tax reform process[135] during 1990-2001, focusing on the area of indirect taxes. In this regard, our results show that a move from dependence on trade tax revenues to GST/VAT revenues has made the overall indirect tax system of Pakistan a little more progressive[136]. This study also carried out a high level of disaggregation of the incidence to reveal its sensitivity to key commodities. It appears post- reform indirect tax incidence is sensitive to taxation of key commodities which include sugar, edible oils and basic fuel/utilities. Incidentally, taxation of these commodities also appears to have strong distributional effect on the poor and our results show that the indirect tax system can be made strongly progressive by exempting these commodities[137].

We also explored the sensitivity of *estimated* tax incidence results to a special case of partial equilibrium tax incidence analysis that assumes zero demand responses. Estimations *illustrate* that incidence results (for the selected sample of commodities) do not appear to be very sensitive to incorporation of own- and cross- price responses. We also used these estimates to identify directions of welfare enhancing reform for Pakistan at margin. We find that a reduction

[135] Also known as the *first generation of tax reform* process in Pakistan
[136] This statement is borrowed from Gemmell and Morrissey (2003) excluding the country reference.
[137] These are not necessarily revenue-neutral recommendations.

in the price of basic items such as beef, wheat, milk and pulses should be welfare enhancing at the margin. Furthermore, taxation of sugar maybe justified on efficiency grounds but not from the equity perspective while taxation of vegetable ghee is justified on both revenue efficiency as well as on equity grounds.

This study has made a significant contribution to tax policy analysis in Pakistan as well as to the literature of tax incidence in general. For instance, this study has not only attempted to disaggregate indirect tax incidence over its major components (namely, GST/VAT, custom duties and excise duty) but further disaggregation of incidence in each case (except custom duties) was undertaken to reveal sensitivity of incidence to key commodities. Needless to say, both of these aims themselves were extremely ambitious given the difficulty of estimating aggregate custom duties and excise duty incidence as well as attempting to further disaggregate this. However, we believe herein lies the strength of this study.

We carried out a separate GST/VAT incidence evaluation pre- and post-reform given the importance of this tax within Pakistan federal taxation structure. Results have revealed that progressivity of GST pre-reform incidence was mainly due to the limited scope of GST/VAT at that time and due to the patterns of exemptions that clearly favored the poor. However, post-reform GST/VAT incidence, despite focus on 'equity' and 'distributional' considerations in the reform agenda, appears at best to be proportional. Our disaggregated incidence results here reveal that taxation of some basic processed food items and basic fuels has undermined the progressivity of GST/VAT. Given this is also the most pervasive component of indirect tax system in the post- reform era, this proportionality has restricted the progressivity of the overall indirect taxation to being slightly so (or progressive over a limited range).

This issue was probed further by exploring how GST/VAT exemptions can be better targeted to safeguard the poor. This was done using the distributional characteristics of a good approach in order to identify goods/services that are relatively more important to the poor. This issue has been explicitly addressed for Pakistan for the first time. Our findings reveal that consumption patterns of key commodity groups such as basic fuels, sugar and edible oils, are sufficiently separable to provide poor households with necessary relief via well targeted exemptions (and not necessarily at too much cost to the exchequer[138]). This is extremely relevant information for the policymakers in Pakistan for safeguarding the poor from the GST/VAT net and for carrying out future GST/VAT reforms.

This study has also attempted to evaluate the pre- and post- reform incidence of custom duties as well as excise duties. Since pre-reform incidence was largely dependent on trade taxes this disaggregation was crucial. The innovation in attempting to measure the incidence of custom duties came from attempting to measure the import content of domestic consumption of major product categories (rather than treating all consumption identically as is done in most other studies). We believe this was a crucial and ambitious undertaking as these estimates had to be generated from relying on many other data sources necessary for carrying out informative analysis. Our results reveal that the inverted U-shaped incidence of pre-reform indirect tax incidence was largely driven by regressivity of custom duties incidence while disaggregated analysis revealed that this regressivity was mainly due to significantly large import share that year (within domestic consumption) for some basic food commodities which included sugar, edible oils, spices and even wheat.

[138] Though this line of argument was not formally investigated

One of the aims of this study was to *illustrate* the sensitivity of *estimated* tax incidence results (summarized in terms of tax progression) to the assumption of zero demand responses (a special case of partial equilibrium tax incidence analysis assumed in some tax incidence studies. For instance see Chen et al., 2001; Munoz et al., 2003; and Sahn and Younger, 2003, to name but a few). Our *illustration* suggests that in most cases (for a selected sample of commodities) our estimated incidence results are not affected much by incorporation of own-price elasticities although not allowing for behavioural responses may appear to overestimate the incidence results slightly. In the case of cross-elasticities, overall impact appears to vary from case to case as it depends on the magnitude and sign of the elasticity and the importance of the other commodities in the consumption basket. Sometimes it makes little difference, in other cases, it matters more. However, generally, incorporation of own-price elasticities plus cross-price elasticities (which could make the impact bigger) is still quite small to impact our results significnatly. We believe by doing this we have made a contribution to the literature on price elasticities and to tax incidence (given any attempt to test the robustness of tax incidence estimates is important rather than ignoring this issue altogether).

We also used our estimates of elasticities (for a selected sample of commodities) to identify the directions of welfare enhancing reform at the margin for Pakistan using the marginal theory of tax reform. Our results show that a reduction in the prices of basic items such as wheat, pulses, milk, and beef should be welfare-enhancing. Results also reveal that further revenue can be raised by raising the price of sugar; this may be efficient but it is not equitable whereas vegetable ghee appears to be an ideal candidate for a price increase on both grounds.

This perhaps also reflects that, in reality, policymakers are faced with a very delicate act of juggling equity, efficiency and administrative convenience.

What is efficient may not necessarily be equitable; thus achieving both goals simultaneously to raise revenue may leave policymakers with very limited options. Thus, this research informs the literature of *ex-ante* tax policy planning and tax reform (in margin) for Pakistan and for this literature in general.

With regards to Pakistan's future tax policy we believe getting the GST/VAT exemptions *right* is a critical policy step for safeguarding the poor because of current and future importance of this tax within the overall federal tax structure. Furthermore, powerful distributional effects created due to taxation of (some) processed food items and basic fuels needs serious reconsideration.

8.2 Qualifications to the Study and Future Directions of Research

Although this study has tried to be ambitious, innovative and comprehensive in meeting its objectives, like all research, its findings are limited to what was achievable within the given the timeframe, availability of data, existing literature and the scope of this study.

This research looks at the welfare effect of a specific *type* of indirect tax reform process that largely focused on replacement of trade tax revenues with GST/VAT revenues. Thus, this study does not claim to be reflective of distributional incidence of a wider reform process that may encompass the whole tax system[139] or overall fiscal policy i.e. tax and expenditure policy. Though these are interesting areas of research they are not the explicit focus of this research.

[139] This may include direct taxes, local and provincial tax and non-tax revenues, implicit taxation issues and surcharges.

It is also worth mentioning that the findings of this study are specific to the particular definition of progressivity used in this study i.e. average productivity rate and also to a particular method of measuring household welfare. The main aim of this research was not to find *the* ideal definition of progressivity or welfare in Pakistan though these can be future areas of research.

Likewise, we have made a simple underlying assumption regarding tastes, preferences and technology. Going beyond this was not possible given the non- availability of data, and time constraints.

Most of the studies on tax incidence for developing and developed countries use the 100 percent tax shifting assumptions particularly where indirect taxes incidence is concerned, although little consensus emerges where pass- through effects of direct taxes are concerned. Given the lack of empirical research in the area of tax shifting, even for developed countries let alone Pakistan and other developing countries, it may be adequate to assume a full tax shifting assumption for indirect taxes. But a cautious interpretation of the results is necessary. Similarly particular features of developing countries such as tax evasion and smuggling can have an important impact on incidence results (though the former may be a more significant problem for direct tax incidence). However, incorporation of these features within our analysis was not possible due to non-availability of necessary data. These however pose interesting questions which should be investigated in the future.

All these factors/issues point towards the fact that ascertaining tax incidence for any country, especially a developing country is a difficult empirical question and there are no easy answers. Future research in the case of Pakistan should focus on incorporating direct taxes into the tax incidence analysis but

realistically hinges on the availability of tax return data which, at present, is not available. Also, given the structure of Household Integrated Economic Survey (HIES) it is not possible to get estimates of services consumption in Pakistan. Since GST/VAT is the most fundamental tax component of Pakistan's tax system we believe these estimates and analysis are necessary to analyze how GST/VAT can be broadened to the services sector and who it is likely to be affected.

Lastly, we would like to add (for various reasons mentioned above) that this study should be taken as more than *just* a study on Pakistan. On the whole, we believe, this study has been ambitious, methodologically innovative and comprehensive which should further strengthen the relevance, uniqueness and innovativeness of this dissertation.

APPENDICES

Appendix 3.1 : Pakistan Tax Incidence Studies (1970 – 2007)						
Author/Year	**Period**	**Income Concept**	**Household/Indv. covered**	**Taxes covered**	**Progressivity Measure**	**Author's Conclusion**
Azfar, 1972 /1	1966-67	household Income (HIES survey)	6 income classes; national, urban and rural	Direct and Indirect	APR	Overall tax system is progressive; urban household pay a much higher proportion than their rural counterparts
Jeetun, 1978	1978	Household Income (from HIES survey)	13 income classes; national, urban and rural	Comprehensive	APR, Lorenz Curve and Gini Coefficient	Overall tax system is progressive; PYT and indirect taxes are progressive.
Kazi, 1984	1972-73 to 1979-80	N.A	Agriculture and Non-Agriculture sector	Comprehensive	N.A	Agriculture sector as a whole is overtaxed compared to non-agriculture sector.
Malik and Saqib, 1989	1978-79	Personal Income (from HIES survey)	12 income classes rural and urban	Direct and Indirect	APR and Suit Index	Overall tax system is slightly progressive at national and urban areas and regressive over rural areas.
Kemal, 2001	1987-88 to 1999-00	not indicated	12 income classes	Direct and Indirect	APR	over the time period, percentage increase in tax burden has been more for the poorest segment of population.

Appendix 3.1 (Contd.) : Pakistan Tax Incidence Studies (1970 – 2007)						
Author/Year	**Period**	**Income Concept**	**Household/Indv. covered**	**Taxes covered**	**Progressivity Measure**	**Author's Conclusion**
Shirazi, Ilyas and Ahmad, 2001	1992-93	Net National Product (NNP)	11 Rural and urban income classes	Comprehensive	APR	Overall tax system is regressive for rural areas and progressive for urban areas.
Refaqat, 2003	2001-02	Household Income	10 Income Deciles	VAT	APR	VAT incidence is proportional if expenditure is used as a base; regressive if income is used as a base.
SPDC, 2004	2001-02 (but direct taxes over 1987-88 & 2001-02)	Not Clear	10 Income Deciles	Direct and Indirect)	APR	Overall tax system is clearly regressive; all components of indirect taxes are regressive; direct taxes are progressive but progressivity over time has declined.
Source: As indicated. Note:1/ Azfar (1972) is cited in De Wulf (1975).						

Appendix 3.2 : Main Findings Pakistan Incidence Studies (1970 – 2007)

	Income (PRs.) monthly Tax Coverage: Comprehensive												
Azfar (1974) /1	**Under 100**		**100 – 200**		**200 – 400**	**400 – 740**		**740 – 1250**		**Over 1250**		**Avg.**	
Total	5.0		6.4		7.9	9.6		16.6		25.3		9.1	
Urban	9.9		10.7		11.5	12.6		21.4		24.3		15.8	
Rural	4.8		6.3		7.0	8.2		12.0		17.3		6.9	
	Income (PRs.) monthly Tax Coverage: Comprehensive												
Jeetun (1978) /2	**Less than 50**	**50 -99**	**100-149**	**150-199**	**200-249**	**250-299**	**300 – 399**	**400 – 499**	**500 – 749**	**750 - 999**	**1000 – 1499**	**1500 - 1999**	**2000 - above**	**Avg.**
(Alt. I)	17.48	9.03	8.55	8.48	9.70	8.52	8.73	9.11	9.52	10.49	14.80	16.43	30.46	11.72
(Alt. II)	15.42	8.21	7.84	7.81	9.10	8.10	8.46	9.11	9.77	11.19	15.84	17.45	31.95	11.72
	Tax Coverage : Sectoral Only												
Kazi (1984)	**% shares**		**1972 -73**	**1973 -74**	**1974 - 75**	**1975 - 76**	**1976 – 77**	**1977 - 78**	**1978 – 79**		**1979 - 80**		
Direct Taxes	Ag.		13.6	16.6	15.0	9.6	5.2	4.6	6.6		5.0		
	Non-Ag		86.40	83.4	85.0	90.4	94.8	95.4	93.4		95.0		
Indirect Taxes	Ag.		23.5	29.3	28.8	28.2	26.9	26.2	27.1		27.5		
	Non-Ag		76.5	70.7	71.2	71.8	72.1	72.8	72.9		72.5		

Appendix 3.2 (Contd.) : Main Findings Pakistan Incidence Studies (1970 – 2007)

Tax Coverage : Comprehensive													
								Income (PRs.) monthly					
Malik and Saqib (1989)		**Upto 300**	**301 -400**	**401 – 500**	**501 – 600**	**601 – 800**	**801 – 1000**	**1001 – 1500**	**1501 – 2000**	**2001 – 2500**	**2501 – 3000**	**3001 – 3500**	**3501 - above**
	National	11.93	11.41	10.75	11.44	10.69	11.30	10.43	10.14	10.21	10.02	13.15	17.60
	Rural	11.63	11.26	10.5	11.03	10.19	10.86	9.5	8.89	8.33	8.01	7.88	8.129
	Urban	14.32	12.37	11.91	13.36	12.54	12.42	11.96	11.62	12.00	11.34	16.54	22.86

Tax Coverage : Comprehensive Income (PRs.) monthly												
Shirazi, Ilyas and Ahmad, (2001)		**Upto 1000**	**1001 – 1500**	**1501 – 2000**	**2001 – 2500**	**2501 – 3000**	**3001 – 3500**	**3501 – 4000**	**4001 – 5000**	**5001 – 6000**	**6001 – 7000**	**7001 & above**
Urban	**Tax Inci..**	44.93	18.00	15.88	14.41	13.93	14.51	17.46	17.01	21.73	27.48	20.28
	Net Fiscal Inci.	20.93	23.67	18.14	15.22	12.96	10.33	5.99	4.86	-1.34	-8.13	3.6
Rural	**Tax Inci..**	33.4	18.55	16.41	14.77	13.97	14.16	12.85	12.93	11.85	10.31	8.94
	Net Fiscal Inci.	12.24	11.19	8.70	7.73	6.77	5.33	5.79	4.83	5.29	5.91	5.82

Tax Coverage : VAT Direct and Indirect												
							Household income per month					
Kamal (2001) /3	**489**	**656**	**758**	**909**	**1259**	**1744**	**2239**	**2748**	**3246**	**3736**	**4246**	**7770**
1987-88	7.94	8.11	8.63	8.18	8.18	8.24	8.10	8.29	8.03	8.87	8.70	10.17
1990-91	8.40	8.49	8.80	8.36	8.29	8.29	8.08	8.14	7.93	8.76	8.52	9.84
1999-00	8.24	8.18	8.18	7.81	7.65	7.54	7.29	7.33	7.13	7.69	7.33	8.14

Appendix 3.2 (Contd.) : Main Findings Pakistan Incidence Studies (1970 – 2007)

				Tax Coverage : VAT only							
				Household per capita annual income							
Refaqat (2003) 4/	**Deciles**	**1st (poorest)**	**2nd**	**3rd**	**4th**	**5th**	**6th**	**7th**	**8th**	**9th**	**10th**
	Alt. I	3.4	3.4	3.42	3.4	3.5	3.6	3.6	3.7	3.85	4.23
	Alt. II	6.76	4.30	4.01	3.88	3.82	3.78	3.63	3.53	3.53	3.02

				Tax Coverage : Federal Taxes							
SPDC (2004)	**Deciles**	**1st (poorest)**	**2nd**	**3rd**	**4th**	**5th**	**6th**	**7th**	**8th**	**9th**	**10th**	**Avg.**
Total tx.		16.1	15.0	14.1	14.1	13.3	12.8	12.5	12.2	11.6	12.0	13.4
Indirect		16.1	15.0	14.1	14.1	13.3	12.7	12.4	11.8	10.9	9.9	13.0
	Sales tax	9.3	8.6	8.2	8.3	8.0	7.7	7.4	7.1	6.7	5.9	7.7
	Excises	4.5	4.2	3.9	3.8	3.5	3.2	3.1	2.9	2.6	2.2	3.4
	Import duty	2.3	2.1	2.0	2.0	1.9	1.8	1.8	1.7	1.7	1.8	1.9
Direct tx			0	0	0	0	0	0.2	0.4	0.7	2.1	0.3

Source: As indicated.
Note: 1/ Azfar (1972) is cited in De Wulf (1975). 2/ Jeetun (1978) alternate I, refers to distribution of taxes following P & O (1974) type of methodology. However, for alternate II he assumes for tobacco a spread of 1 to 5 with the rate of duty as a proportion of retail price being higher by 10 percent in each successive income group. For clothing, this duty proportion being higher by 20 percent in each successive income groups, yielding a dispersion of 1 – 9 (pp. 21). 3/ Kamal (2001) presented incidence results for 1987-88 to 1999-00 but we have cited only three years. 4/ Refaqat (2003), alt. 1 refers to incidence w.r.t. household annual expenditure and alt. II refers to incidence w.r.t. household annual income.

Appendix 3.3: Measurement of Progressivity

1. Average Progressivity Rate (APR)

It may not be wrong to say that progressivity is one of the key concepts in incidence analysis. Statistical progressivity measures like APR record changes in income distribution compared to an alternative such as proportionality (Gemmell and Morrissey, 2005). It is generally agreed that a tax structure is *progressive* where effective tax rate (i.e. tax liability as a percentage of income) rises when we move up the income scale; *regressive* when effective tax rates falls as we move up the income distribution; and *proportional* when effective tax rates remain constant (Musgrave and Thin, 1948). According to Gemmell and Morrissey (2005), average rate of progression is the most common measure used to determine tax progressivity for developing countries. Although this measure provides useful information on the extent to which the tax system departs from proportionality, it cannot quantify the amount of redistribution that takes place through a tax system[140].

2. Distribution Measures

Distributional measure on the other hand, assess if the tax in question increases or reduces a measure of inequality of incomes, poverty etc., of the overall population or some other grouping (Gemmell and Morrissey, 2005). One can generally distinguish between purely statistical measures and normative measures (that use explicit value judgements to ascertain adequacy, rightness and desirability of a tax).

[140] For a comprehensive discussion regarding numerous structural and distributional measures of progressivity, see Musgrave and Thin (1948) and Kiefer (1984).

2.1 Lorenz Curve and Gini Coefficient [141]

One approach specifically focuses on the use of *Lorenz curve* or *Gini coefficient*. *Lorenz curve* shows the relationship between cumulative percentage of population ranked from lowest to highest on the vertical axis and cumulative percentage of income, placed on the horizontal axis. The Lorenz curve in other words maps the cumulative share of income received by bottom X percentage of population (Martinez-Vazquez, 2001). The more Lorenz curve slopes down; the more unequal is the underlying distribution of income. In terms of tax incidence analysis, the comparison of pre- and post-tax income distribution, where one curve wholly lies under the other, equality is said to be greater for the income distribution with a Lorenz curve that lies inside (Gemmell and Morrissey, 2005).

However, the comparison of Lorenz curve may not always work if Lorenz curves cross; thus a simpler way to summarize this information is to use *Gini coefficient* that summarizes the same information. In this case the "before" and "after" comparison of Gini coefficient allows one to analyze whether the resultant tax will positively or negatively affect the distribution of income, henceforth its progressivity. These have been readily used for tax incidence analysis for developing countries[142].

[141] Where coefficient of equality or Gini coefficient (G) can be written as: $G=1+1/n - (y_1 + 2y_2+\ldots+_{nyn})*2/(n^2*\mu)$, where *n* is the number of individuals, y_i is the income of the ith individual, μ is the average income, and subscript 1 to n run from highest to lowest income.

[142] For application see Engel, Galetovic and Raddatz (1998) for Chile, El-Edel (1970) for Egypt, Jeetun (1978) for Pakistan, Chen et al. (2001) for Uganda, Munoz et al. (2003) for Ethiopia and Prasada et al. (2005) for Sri Lanka.

However, indexes based on Gini coefficient have been criticised for two main reasons. First, these indexes attach highest weight to income transfers from income brackets close to the mode of income distribution compared to either evenly distributing these weights or giving more weight to the tail of the distribution (Atkinson, 1973; Dasgupta, Sen and Starrett, 1973; and Sen, 1973). Second, it is desirable for an index to attach most weight to improving the income distribution of the poor particularly when income distribution is very unequal but treat the improvements near the mean more symmetrically. But Gini has the same symmetric weighting irrespective of how equal or unequal the income distribution is (Blackorby and Donaldson, 1978).

2.2 Concentration Curves

A concentration curve is an idea similar to Lorenz curve. It depicts a relationship between the cumulative tax payment on the vertical axis and cumulative population ranked by pre-tax income on the horizontal axis. If a concentration curve of tax payment lies wholly outside the concentration curve of expenditures; the tax is clearly progressive. Application of this curve for tax incidence analysis is also frequent[143].

2.3 Indexes based on explicit value judgment: Atkinson index

Even a basic descriptive index such as Gini coefficient can be shown to make use of an implicit set of weights or giving relative importance to individuals at different income levels. For instance, Gini coefficient implicitly gives higher

[143] For application see, Sahn and Younger (1998) for Cote d'Ivoire, Munoz et al. (2003) for Ethiopia, Prasada et al (2005) for Sri Lanka, and Chen et al. (2001) for Uganda.

importance to changes in income of individual is closer to the mode of the distribution. One way to get rid of this accidental choice of weights is by explicitly choosing these weights (Vazquez, 2001). Such an index is the Atkinson index, which uses explicit weights derived from an explicit social welfare function. The Atkinson index uses an "inequality aversion parameter" with the intention of capturing social aversion to inequality in the distribution of income (Atkinson, 1983)[144]. This can be written as $A=1-y_e/\mu$, where y_e is the "equally distributed income" i.e. income if distributed equally will produce the same level of social welfare, μ is average actual income and *e* is inequality aversion parameter[145]. The definition of y_e uses an inequality aversion parameter *z* which is less or equal to one, as follows: $y_e = \{[(y_1)^{\varepsilon} + (y_2)^{\varepsilon} + \ldots\ldots\ldots + (y_n)^{\varepsilon}]/n\}^{1/\varepsilon}$ (Vazquez, 2001).

2.4 Welfare Dominance[146]

The comparisons of Lorenz or concentration curves have given rise to the notion of dominance (Gemmell and Morrissey, 2005) which is another criterion that is used to determine tax progressivity. In this case when a curve dominates another curve definitely; this represents a more equal distribution of income or more dominant or progressive tax (Gemmell and Morrissey, 2005; Sahn and Younger, 1999). The statistical test used to measure this dominance is known as welfare dominance and this methodology is developed by Yitzhaki and Slemrod (1991).

Intuitively, the term welfare dominance means that for any social welfare function that favours an equitable distribution of income, a revenue neutral tax change that reduces taxes on one good *x* but increases taxes on good *y* will

[144] Atkinson index is a normative index.
[145] For application see Murty (1989) for India.
[146] Welfare dominance is a normative measure.

improve social welfare as long as the concentration curve for the tax on *x* lies above the concentration curve of *y*. Thus, the theory of welfare dominance for a broad class of social welfare functions, provides a general criterion to ascertain if one distribution of welfare is better than another (Saposnik, 1981; Shorrocks, 1983; Foster and Shorrocks, 1988; Yitzhaki and Slemrod, 1991; Lambert, 1993). In practice, the attraction of the welfare dominance criterion is that statistical tests can be used to determine dominance of one curve over the other (Younger et al., 1999). In many cases crossing of Lorenz curve makes it impossible to determine dominance; in such cases a more sophisticated approach such as generalized Lorenz curves can be used.[147] However, use of welfare dominance approach in tax incidence analysis for developing countries has largely focused African countries[148].

[147] The generalized Lorenz curve can be defined as:

$$N(i) = \left(\frac{\sum_{k=1}^{i} w_k}{\sum_{k=1}^{n} w_k} \right) * \mu(w)$$

Where N(i) is the generalized Lorenz ordinate and μ(w) is the mean of the distribution of W. The generalized Lorenz curve plots the cumulative share of individuals in the sample (indexed by i) on the x-axis against cumulative share of the welfare variable multiplied by its mean on the y-axis. The Lorenz curve is identical but not scaled by the mean (Sahn and Younger, 2003).

[148] For application see Younger (1996), Younger et al. (1999), Sahn and Younger (1998), Munoz et al. (2003) for Ethiopia, and Chen et al. (2001) for Uganda.

Appendix 4.1: HIES Survey Design and Sampling Methods

4.1 Sampling Frame

The HIES 1990-91 and 2001-02 cover all urban and rural areas of the four provinces of Pakistan except some parts of northern areas and FATA[149]. The FBS uses separate sampling frames for urban and rural areas of Pakistan. For urban areas, FBS has developed a sample frame using quick count listing methods for households in major cities and town. Each area is subdivided into enumeration blocks based on 200 to 250 households. The list of enumeration blocks is updated using Census of Establishments conducted during 1988. For rural areas the list of village/mouzas/dehs published in population and housing census of 1981 and 1998 is used as a frame for HIES 1990-91 and 2001-02 respectively (FBS, HIES 90-91, pp. 15; FBS, HIES 01-02, pp. 21; International Monetary Fund, 2004).

4.2 Stratification Plan

The FBS uses two stage sample design for HIES survey. In urban areas each large size city is treated as an independent stratum and further divided into low, middle, and high income sub-strata in the light of information from enumeration blocks. The remaining urban areas in all provinces are grouped together and treated as an independent stratum. In rural areas, the population of each district in Punjab, Sindh and NWFP province have been grouped together to make a stratum while for Balochistan province each of defunct administrative division is taken as a stratum (FBS, HIES 01-02, pp. 22).

[149] FATA refers to Federal Administrated Tribal Area and this area constitutes around 3 percent of total population.

4.3 Sample Design

Enumeration blocks in the urban areas and mouzas/dehs/village in the rural areas were the primary sampling units (PSUs). The sample of PSUs was selected by probability to size (PPS) based on the number of households in the PSU. The households within PSU were taken as secondary sampling units (SSUs) and chosen using systematic sampling scheme with a random start. Sixteen and 13 households respectively are chosen from each rural PSU and 12 and 10 households from each urban PSU are selected for HIES 1990-91 and 2001-02 survey respectively. This sampling procedure implies that households living in different parts of the country have been selected for the PIHS surveys with differing probabilities of selection. In order to derive representative statistics for each of the provinces, as well as for the country as a whole, raising factors (i.e. sampling weights) are applied. These raising factors take into account the sampling strategy adopted in the survey and weight each household by a factor that is inversely proportional to its probability of selection

Appendix 4.2: HIES (1990-91) and (2001-02) Item by item comparison and coding

HIES (2001-02) Item List	HIES (01-02) ITC Codes	Freq.	HIES (90-91) ITC Codes	Freq.
a: Milk and Milk Products	1100	Fortnightly		Monthly
Milk (fresh & boiled)	1101		3041	
Lassi (buttermilk)	1102		3042	
Milk (packed by milk plants)	1103		3043	
Milk, Powdered (for adults & children)	1104		3044, 3045, 3046	
Butter, Margarine, Cream	1105		3048, 3053	
Cheese	1106		3049	
Curd / Yoghurt	1107		3052	
Ice cream, Kulfi	1108		3051	
Other like ferni, kheer, condensed milk, etc.	1109		3047, 3054	
b: Meat Poultry and Fish	1200	Fortnightly		Monthly
Beef	1201		3072	
Mutton	1202		3071, 3073	
Chicken Meat (fresh, frozen)	1203		3081, 3082	
Eggs	1204		3083	
Other poultry birds (ducks, quail, turkey etc.)	1205		3084	
Fish (fresh, frozen, dried)	1206		3074, 3075	
Prawns, Shrimps or Crabs (fresh, frozen, canned)	1207		3076, 3077	
c: Fresh Fruits:	1300	Fortnightly		Monthly
Banana	1301		3091	
Citrus fruits (Mosummi, Malta, Kinno etc.)	1301		3092	
Apple	1303		3093	
Dates	1304		3102	
Grapes	1305		3095	
Mango	1306		3096	
Melon (Water, Garma, Sarda)	1307		3097	
Guava	1308		3103	
Other fresh fruits (Pomegranates, Apricot, Jamons, Lemon, Peer, Peach, Plum, Papaya etc.)	1309		3094, 3098, 3099, 3101, 3104	
Canned fruits	1310		3105	
d: Dry Fruits & Nuts	1400	Fortnightly		Monthly
Raisin, Dates, Apricot (dried)	1401		3116	
Other (Almond, Walnut, Chilgoza, Pistachio, Peanuts, Aniseed, Cashew, Coconut, Sesame seeds, etc.)	1402		3111, 3112, 3113, 3114, 3115, 3117	
e: Vegetables	1500	Fortnightly		Monthly
Potato	1501		3121	
Onion	1502		3123	

Appendix 4.2: HIES (1990-91) and (2001-02) Item by item comparison and coding

HIES (2001-02) Item List	HIES (01-02) ITC Codes	Freq.	HIES (90-91) ITC Codes	Freq.
Tomato	1503		3122	
Cabbage, Cauliflower	1504		3125, 3126	
Karaila, Lady finger, Brinjal, Cucumber	1505		3127, 3129, 3130	
Tinda, Pumpkin, Bottle Gourd	1506		3128, 3132, 3133	
Radish, Turnip, Carrot	1507		3124, 3134, 3138	
Peas, Moongra	1508		3135, 3137	
Other (Green Chillies, Tural, Lettuce, Kulfa etc.)	1509		3139, 3140, 3131, 3136	
Canned vegetables	1510		3141	
f: Condiments & Spices (Whole & Powder)	1600	Fortnightly		Monthly
Salt Simple (rock and sea)	1601		3151, 3152	
Salt (Iodised)	1602		N.A.	
Chillies, red	1603		3157	
Turmeric, Coriander seed	1604		3156, 3158	
Ginger	1605		3159	
Garlic	1606		3160	
Cinnamon, Caraway, Cardamom	1607		3153, 3154, 3155	
Salan Masalah/Other spices (Licorice root, Cumin seeds, Black pepper,Cloves, Mixed condiments)	1608		3161, 3162	
g: Sugar, Honey and Sugar Preparations	1700	Fortnightly		Monthly
Sugar (Desi or Milled)	1701		3170, 3171	
Gur / Shakkar	1702		3172	
Honey (fresh or processed)	1703		3173	
Confectionery (Toffee, Chocolate, Chewing gum etc)	1704		3175	
Barfi, Jaleebi, Halwa & other sweetmeats	1705		3176, 3177, 3178, 3179	
Glucose, Energile etc.	1706		N.A.	
h: Non Alcoholic Beverages	1800	Fortnightly		Monthly
Carbonated beverages	1801		3191	
Squashes & Syrups (not medicated)	1802		3174, 3192	
Sugarcane juices, Other fresh juices	1803		3193	
Fruit juices (packed), Mineral water etc.	1804		3194	
i: Readymade Food, Drinks etc.	1900	Fortnightly		Monthly
Readymade meals, cooked food purchased from outside home (hotel & restaurant) but consumed at home	1901		3211	
Readymade meals, snacks, tea, ice cream, drinks, purchased and consumed outside home or provided by employer	1902		3212, 3213, 3214, 3215	
Instant foods	1903		N.A.	
Cereals		Monthly - Female		Monthly

Appendix 4.2: HIES (1990-91) and (2001-02) Item by item comparison and coding

HIES (2001-02) Item List	HIES (01-02) ITC Codes	Freq.	HIES (90-91) ITC Codes	Freq.
Wheat and Wheat flour	2101		3001, 3002	
Rice and rice flour	2102		3003, 3004	
Maize, Barley, Jawar and Millet (Whole and Flour)	2103		3005, 3006, 3007, 3008	
Suji, Maida, Besan	2104		3009, 3010	
Other cereals products (Vermicellies, Corn flakes, Noodles, Macronis, Spageite) etc.)	2105		3011	
b. Pulses - Split and Whole / Washed and Unwashed	2200	Monthly - Female		Monthly
Gram Whole (Black and White)	2201		3031, 3032	
Dal chana	2202		3037	
Mash	2203		3033	
Moong	2204		3034	
Masoor	2205		3035	
Other (Arhar, chick / pigeon /garden peas, sunflower, soybean)	2206		3036, 3037	
c. Edible Oils and Fats	2300	Monthly - Female		Monthly
Desi Ghee	2301		3050	
Vegetable Ghee	2302		3061	
Cooking Oils	2303		3063	
Other oils and fats	2304		3062, 3064	
d. Tea and Coffee	2400	Monthly - Female		Monthly
Tea (black, green loose & packed)	2401		3181, 3182, 3183, 3184	
Coffee	2402		3185	
Other (ovaltine, harlics, Milo, Complan etc.)	2403		3185	
e: Baked and Fried Products	2500	Monthly - Female		Monthly
Biscuits (Sweet & Saltish)	2501		3021	
Bread, Bun, Sheermal	2502		3022	
Cake, Bakerkhani	2503		3023	
Pastries, Patties, etc.	2504		3024	
Tandoori Roti, Nan, Kulcha, Puri, Paratha	2505		3025	
Other baked or fried products (Pakoras, Samosa, Qatlama, popcorn etc.)	2506		3026, 3027	
f. Miscellaneous Food Items	2600	Monthly - Female		Monthly
Jams, Marmalades etc.	2601		3221	
Tomato Ketchup/pulp	2602		3222	
Pudding, Jelly etc.	2603		3223	
Pickles, Chatni etc.	2604		3225	
Vinegar, Yeast, Ice etc.	2605		3224, 3226, 3227	

Appendix 4.2: HIES (1990-91) and (2001-02) Item by item comparison and coding

HIES (2001-02) Item List	HIES (01-02) ITC Codes	Freq.	HIES (90-91) ITC Codes	Freq.
Food and Grain milling/grinding charges	2606		N.A.	
B. FUEL AND LIGHTING	2700	Monthly - Female		Monthly
Fire wood	2701		3231	
Kerosene oil	2702		3232	
Char coal	2703		3233	
Coal hard & soft peat	2704		3234	
Dung cake (dry)	2705		3235	
Gas (pipe)	2706		3236	
Gas (cylinder)	2707		3237	
Electricity	2708		3238	
Match box, Candles, Mantle etc.	2709		3239, 3240	
Beggasses, Agricultural wastes for fuel purposes (cotton sticks,sawdust, shrubs, weeds, tobacco sticks, etc.),	2710		3241, 3242	
C. MISCELLANEOUS EXPENDITURES a. Personal Care Articles	2800	Monthly - Female		Monthly
Bath /Toilet soap	2801		3251	
Shampoo	2802		3256	
Hair oil & creams, hair tonic & colour, Facial cream & powder etc.	2803		3257, 3258, 3259	
Toothpaste & powder, Brush, Miswak	2804		3252, 3253, 3254	
Cosmetics such as nail polish, perfumes, lipsticks, colognes, lotions etc.	2805		3255	
b. Personal Care Services	2900	Monthly - Female		Monthly
Hair cutting & dressing etc. for men(include shaving material), women and children	2901		3261	
Beauty parlor services	2902		3265	
Dry cleaning, washing, dying, darning	2903		3262, 3263, 3264	
c. Household laundry Cleaning and Paper Articles	3000	Monthly - Female		Monthly
Laundry soap, bleaching and other laundry articles, Washing powder, Dishwashing articles etc.	3001		3291, 3292	
Household cleaning articles like cleaners, brooms, dusters, sponges, cleaning wipers, mops polishes, waxes, buckets, etc.	3002		3293	
Paper napkins, wax papers and other paper articles etc.	3003		3294	
A: Tobacco and Chewing Products	4100	Monthly Male		Monthly
Cigarettes and lighters	4101		3201	

Appendix 4.2: HIES (1990-91) and (2001-02) Item by item comparison and coding

HIES (2001-02) Item List	HIES (01-02) ITC Codes	Freq.	HIES (90-91) ITC Codes	Freq.
Biri	4102		3202	
Tobacco Raw	4103		3203	
Pan prepared	4104		3204	
Pan leaves	4105		3204	
Katha, Choona	4106		3205, 3206	
Betel nut	4107		3207	
Sonf Suparee	4108		3208	
Chewing Tobacco & Snuf	4109		3209	
B. Recreation & reading	4200	Monthly Male		Monthly
Tickets for cinemas, musical concerts, spectacular sports, Lottery tickets,	4201		3271, 3275	
Rent of TV/VCR/Video cassettes, CD's etc.	4202		N.A.	
Newspapers, magazines, novels, books (rented, purchased, not for education)	4203		3273	
C. Personal Transport and Traveling (Not for commercial use)	4300	Monthly Male		Monthly
Petrol/ Diesel charges, lubricants & oils, punctures	4301		3281, 3282, 3283	
Expenses on travelling by road (bus, taxi, rickshaw etc.)	4302		3285	
Expenses on travelling by train	4303		3286	
Other travelling charges like tongas, camels, donkeys, ferries, bicycles, Garage rent etc.	4304		3288, 3284	
D. Other Miscellaneous Household Expenses on Goods and Services	4400	Monthly Male		Monthly
Wages & salaries paid to servants, gardeners, sweepers, chowkidars, aya, drivers, cleaners, Guards	4401		3301	
Telephone, telegraph, postal, fax, E-mail, and Internet etc. charges	4402		3302	
Storages, safe deposits and locker etc. charges.	4403		3303	
Pocket money to children	4404		3304	
Expenses on maintenance of pets, poultry and fish (curing) - for home use only	4405		3305	
Other expenditures not elsewhere classified	4406		3305	
A. Apparel Textile, Footwear & Personal Effects				
a. Clothing, Clothing material and services	5100	Annual Non-Durable		Annual
Woolen cloth (suits, trousers, coats, etc.), Cotton cloth (shirts, shalwar, etc.), Mixed(nylon etc.),Dupatta	5101		3321, 3322, 3323	

Appendix 4.2: HIES (1990-91) and (2001-02) Item by item comparison and coding

HIES (2001-02) Item List	HIES (01-02) ITC Codes	Freq.	HIES (90-91) ITC Codes	Freq.
Wool for sweaters, socks, shawls, gloves etc.	5102		3324	
New ready-made & second hand garments/under garments (for males, females & children), Sweaters, Sari etc.	5103		3325, 3326	
Burka, Chadar, Ajrak etc.	5104		3327	
Clothing supplies(threads, needles, pins, buttons, zipper, hangers etc.)	5105		3328, 3329	
Tailoring, embroidery, alterations etc. charges	5106		3330	
b. Footwear and repair charges	5200	Annual Non-Durable		Annual
Footwear made of leather, synthetic or any other material (all types new or second hand)	5201		3341, 3342, 3343, 3344	
Repair charges of footwear, Polishes, shoe shining and cleaning brushes etc.	5202		3351, 3352	
c. Personal effects and service and repair charges	5300	Annual Non-Durable		Annual
Brief cases, hand bags, watch straps, belts etc. (leather or plastic)	5301		3361, 3362	
Imitation and plastic Jewellery & ornaments (bangles, necklaces and earings, tie pins, cuff links, etc.)	5302		3363	
Gloves, handkerchief, scarfs, hats, muffs, ties, etc.	5303		3364, 3365	
Repair charges of personal effects (watches, clocks, glasses, etc.)	5304		3371	
B. Housing a. House rent and housing expenses	5400	Annual Non-Durable		Annual
House rent (Market value)	5401		3381	
Subsidized house rent (Hiring, Self hiring) (Market value)	5402		3388	
Rent free accommodation(Market value)	5403		3382	
Owner occupied accommodation(Market value)	5404		3383	
Summer cottage rent	5405		3387	
Minor repairs/maintenance & redecoration/addition/alteration	5406		3384	
Other expenses (insurance, commission paid, water/conservancy/sewerage charges, Summer cottage etc.)	5408		3388, 3386	
b. Chinaware, Earthenware, Plastic ware etc. for daily use and other household effects	5500	Annual Non-Durable		Annual
Crockery & Cutlery for daily use	5501		3391, 3395	

Appendix 4.2: HIES (1990-91) and (2001-02) Item by item comparison and coding

HIES (2001-02) Item List	HIES (01-02) ITC Codes	Freq.	HIES (90-91) ITC Codes	Freq.
Earthenware (ghara, sorahi etc.), Glassware, plasticware, woodware and lacquer	5502		3392, 3393, 3394	
Other household effects (bulbs, tubes, switches, battery cells, lamp shades etc.)	5503		3411, 3412, 3413, 3414	
C. Miscellaneous Expenditure a. Medical care	5600	Annual Non-Durable		Annual
Purchase of medicines & vitamins, medical apparatus, and other equipment / supplies etc.	5601		3421	
Dental care, teeth cleaning, extraction, charges, eye glasses and all others, not elsewhere classified	5604		3425, 3422	
b. Recreation, traveling & transport expenditure	5700	Annual Non-Durable		Annual/ *Monthly
Expenditure on hobbies, Cable installation recreational membership fee, toys, games, photography, lodging charges etc.	5701		3432, 3272*, 3433, 3274*, 3431	
Expenditure on by Air Travel	5705		3287*	
Other expenses on tyre, tube, spare parts, repairs of vehicle etc. and service charges	5706		3444, 3445, 3446	
c. Educational and Professional Stationary Supplies expenditure	5800	Annual Non-Durable		Annual
School/college fees and private tuition fees	5801		3451, 3454	
Books and exercise note books / copies, stationary etc.	5802		3452	
Hostel expenses	5803		3453	
Other education expenses (bags, professional society membership, transportation etc.)	5804		3456, 3457	
Stationery supplies such as pen, pencils, stapling machine, pin etc. (other than education purpose)	5805		3461	
d. Taxes & Fines and all other Miscellaneous expenditure	5900	Annual Non-Durable		Annual
Legal expenses (not related to business)	5903		3483	
Insurance premium such as fire, accident and travel insurance (exclude life / housing/vehicle insurance).	5904		3484	

Appendix 4.3: Household Expenditures (as a % of total expenditures) Urban and Rural Pakistan (1990-2001)

Appendix 4.3 : Household Expenditure (as a % age of total expenditure)

	Deciles	Total Food Exp	*Milk*	*Sugar*	Cereals	*Wheat*	*Rice*	Edible oils	*Veg. Ghee*	Tobacco	Fuels	*Kerosene*	*Electricity*	Travel Group	*Public Transport*	Clothing	Education	House Rent	Health	Durable Exp
											(1990 - 91)									
Urban	1	57.3	8.9	3.9	15.9	13.1	2.5	5.1	4.9	1.8	7.5	0.7	2.5	1.7	1.4	9.1	1.4	12.6	2.6	0.8
	2	54.7	9.5	3.7	13.2	10.9	2.0	4.9	4.5	2.3	6.9	1.1	2.6	2.2	1.9	9.2	1.6	14.3	2.8	0.3
	3	53.4	9.3	3.5	12.2	9.3	2.4	5.0	4.3	1.9	6.5	0.8	2.8	2.5	2.2	8.6	1.5	16.6	3.0	0.3
	4	52.5	9.7	3.1	10.7	8.3	2.1	4.7	4.1	2.3	6.5	1.1	2.7	2.6	2.2	8.5	2.0	16.4	2.3	0.4
	5	51.1	9.6	3.0	9.5	7.5	1.8	4.3	3.8	2.8	6.2	1.1	2.6	3.3	2.7	8.7	1.9	16.8	3.0	0.3
	6	49.7	8.8	2.8	9.0	6.8	1.9	4.1	3.4	2.4	5.9	1.0	2.4	3.8	3.0	8.1	1.9	18.9	3.1	0.4
	7	49.0	8.7	2.6	8.2	6.2	1.8	4.0	3.2	2.8	5.9	1.3	2.5	3.9	2.8	8.0	2.0	19.4	3.6	0.4
	8	48.1	8.4	2.4	7.2	5.2	1.7	4.0	3.0	2.0	5.6	1.0	2.5	4.3	2.9	8.6	2.0	19.7	3.5	0.4
	9	45.1	8.0	1.9	5.5	3.8	1.4	3.4	2.2	2.1	4.8	0.3	2.3	5.0	2.6	7.2	2.9	22.5	2.3	0.8
	10	30.7	5.9	0.9	2.8	1.7	0.9	1.9	0.8	1.5	3.7	0.2	2.3	10.8	1.5	5.5	4.9	29.0	2.0	0.7
	Total	**46.4**	**8.3**	**2.4**	**8.0**	**6.0**	**1.7**	**3.8**	**2.9**	**2.2**	**5.5**	**0.8**	**2.5**	**4.9**	**2.3**	**7.8**	**2.6**	**20.4**	**2.8**	**0.5**
Rural	1	62.6	10.8	4.7	18.2	15.3	2.4	6.5	5.5	2.0	7.1	0.7	1.1	1.8	1.7	9.7	0.8	8.1	3.7	0.5
	2	61.4	11.8	4.9	15.6	12.6	2.4	5.9	5.0	2.2	7.4	0.7	1.3	2.5	2.2	9.8	0.8	8.2	2.7	0.5
	3	61.0	12.7	4.6	14.7	11.7	2.7	6.0	4.8	2.3	6.7	0.7	1.4	2.4	2.2	9.8	0.9	9.3	3.1	0.5
	4	60.4	12.5	4.4	14.1	10.9	2.5	5.5	4.4	2.5	6.6	0.7	1.1	2.6	2.4	9.4	0.8	10.0	3.1	0.5
	5	59.7	12.4	4.5	12.7	9.8	2.3	5.9	4.3	2.4	6.8	0.7	1.3	2.3	2.1	9.3	1.2	9.6	2.9	0.5
	6	58.4	13.0	4.2	12.4	9.3	2.5	5.6	3.9	2.3	6.7	0.7	1.3	2.9	2.6	8.7	1.0	10.9	3.7	0.5
	7	57.3	12.9	3.9	10.9	8.2	2.2	5.5	3.6	2.2	6.2	0.7	1.5	2.9	2.4	8.9	1.2	11.4	3.4	0.4
	8	57.4	14.2	3.7	10.0	7.5	2.0	5.3	3.3	2.3	6.1	0.8	1.4	3.1	2.4	8.7	1.2	11.8	3.5	0.4
	9	55.0	13.0	3.4	9.1	6.8	1.8	5.3	3.0	2.4	6.3	0.7	1.3	4.1	2.5	8.6	1.1	12.1	3.6	0.4
	10	48.6	10.9	2.5	6.3	4.1	1.8	4.3	1.9	2.3	4.5	0.6	1.3	5.8	2.3	7.9	1.4	13.7	3.6	0.4
	Total	**57.1**	**12.4**	**3.9**	**11.6**	**8.8**	**2.2**	**5.4**	**3.7**	**2.3**	**6.2**	**0.7**	**1.3**	**3.3**	**2.3**	**8.9**	**1.1**	**10.9**	**3.4**	**0.5**

Source: Authors own calculation using HIES (1990-91) & (2001-02)

Note:1/ All figures are in percentages calcuated as a porportion of total household annual expenditure.

Appendix – 4.3 (contd.)

Appendix 4.3 (Contd.) : Household Expenditure (as a % age of total expenditure)

	Deciles	Total Food Exp	*Milk*	*Sugar*	Cereals	*Wheat*	*Rice*	Edible oils	*Veg. Ghee*	Tobacco	Fuels	*Kerosene*	*Electricity*	Travel Group	*Public Transport*	Clothing	Education	House Rent	Health	Durable Exp
											(2001 - 02)									
Urban	1	51.6	7.6	3.9	16.4	13.5	2.8	5.6	5.2	2.0	9.9	0.2	4.9	1.9	1.7	8.1	2.7	12.8	1.6	0.8
	2	49.7	8.0	3.9	14.3	11.1	3.1	5.2	4.5	1.7	9.9	0.3	5.2	2.3	2.6	7.3	3.4	14.0	1.6	1.1
	3	47.8	8.4	3.4	12.0	9.4	2.4	4.9	4.2	1.7	9.2	0.2	5.1	2.8	3.2	7.3	3.9	15.5	1.7	1.4
	4	44.5	8.4	3.1	10.1	7.7	2.2	4.5	3.6	1.6	9.0	0.2	5.2	3.5	4.2	7.3	4.3	17.4	1.7	1.4
	5	43.8	8.2	3.0	9.2	6.9	2.2	4.4	3.2	1.4	9.0	0.3	5.3	3.5	4.9	6.6	4.8	18.1	1.8	1.6
	6	41.9	8.1	2.5	8.3	6.1	2.0	4.1	2.9	1.6	8.5	0.2	4.9	4.2	5.5	6.5	4.8	19.5	1.6	1.9
	7	41.3	8.4	2.3	7.0	5.1	1.7	3.9	2.5	1.2	7.7	0.2	4.6	4.1	5.7	6.3	5.4	19.3	1.8	2.0
	8	36.7	7.6	1.9	5.7	4.1	1.4	3.4	2.0	1.2	7.8	0.2	4.9	4.5	5.5	6.1	5.5	22.7	1.9	2.5
	9	33.0	6.5	1.6	4.4	3.1	1.2	3.1	1.5	0.9	7.3	0.1	4.8	5.1	6.3	5.6	7.0	23.1	2.1	2.7
	10	25.1	4.3	0.8	2.1	1.3	0.7	1.7	0.5	0.5	5.8	0.0	4.4	5.2	6.6	3.8	6.8	29.4	1.2	2.3
	Total	**37.7**	**7.0**	**2.2**	**7.0**	**5.2**	**1.6**	**3.5**	**2.4**	**1.2**	**7.8**	**0.2**	**4.8**	**4.2**	**4.7**	**5.9**	**5.4**	**21.5**	**1.7**	**2.0**
Rural	1	59.1	8.3	4.7	22.2	18.5	3.5	6.3	6.0	2.3	9.2	0.4	2.7	2.1	1.9	8.6	1.3	6.5	2.0	0.4
	2	58.6	9.1	5.0	19.4	15.5	3.6	6.0	5.5	2.2	8.9	0.5	2.8	2.4	2.5	8.6	1.6	6.5	1.8	0.5
	3	58.4	9.9	4.9	17.9	14.1	3.5	5.9	5.1	2.1	8.8	0.4	3.2	2.6	3.0	8.4	2.0	6.5	2.2	0.6
	4	57.2	9.8	4.8	16.8	13.0	3.4	5.6	4.8	2.1	8.8	0.5	3.1	2.8	3.3	8.4	2.1	6.9	2.0	0.6
	5	57.0	10.1	4.7	15.9	12.3	3.2	5.6	4.7	2.2	8.8	0.5	3.0	3.0	3.6	8.3	2.3	6.9	2.0	0.7
	6	56.4	10.4	4.7	14.7	11.3	2.9	5.7	4.5	1.9	8.6	0.4	3.1	3.3	4.0	8.1	2.4	7.3	2.2	0.8
	7	56.1	10.9	4.5	13.8	10.6	2.8	5.7	4.4	2.0	8.7	0.4	3.3	3.3	4.0	7.8	2.1	7.9	1.9	0.9
	8	54.7	11.3	4.0	12.2	9.4	2.4	5.5	3.8	1.9	8.4	0.4	3.3	3.8	4.3	7.8	2.4	7.8	2.1	1.2
	9	52.4	11.4	3.7	10.6	8.1	2.2	5.2	3.5	1.6	8.4	0.4	3.6	4.5	5.5	7.5	2.8	9.1	2.2	1.4
	10	46.1	10.4	2.8	7.2	5.5	1.5	4.6	2.5	1.4	8.3	0.6	4.0	5.8	6.4	6.6	4.1	9.9	2.2	2.1
	Total	**54.5**	**6.4**	**2.6**	**8.6**	**6.8**	**1.7**	**3.4**	**2.6**	**1.2**	**5.4**	**0.3**	**2.1**	**2.3**	**3.9**	**4.9**	**1.6**	**4.9**	**1.3**	**0.7**

Source: Authors own calculation using HIES (1990-91) & (2001-02)

Note:1/ All figures are in percentages calcuated as a porportion of total household annual expenditure.

Appendix 5.1: Distributional Characteristics of Goods (HIES 2001-02)

	Social Weights Based on			
	Low Inequality Aversion (v = 0.5)		High Inequality Aversion (v = 2.0)	
	d_i	Rank	d_i	Rank
beggasses, agri. waste	1.097	1	1.368	1
dung cake (dry)	1.058	2	1.150	4
biri	1.056	3	1.077	7
food grain milling charges	1.047	4	1.132	5
gur/shakkar	1.041	5	1.041	8
other oils and fats	1.036	6	1.185	3
wheat and wheat flour	1.033	7	1.085	6
other poultry bird (ducks,quail,etc)	1.024	8	0.988	12
chewing tobacco & snuf	1.021	9	0.979	14
salt (simple, rock or sea)	1.015	10	1.033	10
fire wood	1.015	11	0.960	16
chillies (red)	1.013	12	1.033	9
vegetable ghee	1.011	13	0.993	11
coal hard & soft peat	1.010	14	1.203	2
other pulses	1.009	15	0.952	17
tobacco raw	1.005	16	0.984	13
maize, barly, jawar etc.	0.998	17	0.843	37
potato	0.994	18	0.970	15
rice and rice flour	0.994	19	0.937	19
sugar (desi or milled)	0.988	20	0.918	24
dal chana	0.987	21	0.930	21
laundry soap, etc.	0.984	22	0.947	18
moong	0.983	23	0.928	22
cigarettes	0.982	24	0.932	20
onion	0.981	25	0.924	23
karaila, lady finger,brinjal,cocumber	0.978	26	0.902	25
tinda, pumpkin, bottle gourd	0.974	27	0.881	26
other (green chillies, turai, lettuce, kul	0.971	28	0.879	27
tea (black,green etc.)	0.969	29	0.863	28
vinegar, yeast,ice etc	0.968	30	0.848	35
char coal	0.968	31	0.836	41
cabbage,cauliflower	0.966	32	0.853	34
expenses on maintenance of pets	0.965	33	0.819	42
kerosene oil	0.963	34	0.844	36
garlic	0.960	35	0.862	29
radish, turnip, carrot	0.959	36	0.819	43
tailoring, embroidery charges	0.958	37	0.859	31
masoor	0.957	38	0.840	39
woolen/cotton/mixed clothes	0.957	39	0.858	32
lassi(buttermilk)	0.956	40	0.794	47
match box, candles, etc.	0.955	41	0.860	30
earthenware, glassware	0.951	42	0.841	38
hair oil & cream, etc.	0.950	43	0.855	33
hair cutting etc.	0.949	44	0.839	40
clothing supplies	0.943	45	0.781	48
bath/toilet soap	0.943	46	0.811	44
other travelling charges	0.939	47	0.737	55
footwear	0.936	48	0.797	45
pocket money to children	0.933	49	0.795	46
turmeric, corriander seed	0.933	50	0.764	50
beef	0.933	51	0.743	54
milk (fresh & boiled)	0.930	52	0.758	52
repair charges of footwear	0.929	53	0.766	49
cheese	0.928	54	0.673	69
betel nut	0.928	55	0.677	67

Appendix 5.1 (contd.): Distributional Charachteristics of Items Consumed in Pakistan (2001- 02)

	Social Weights Based on			
	Low Inequality Aversion (v = 0.5)		High Inequality Aversion (v = 2.0)	
	d_i	Rank	d_i	Rank
other spices	0.926	56	0.748	53
mash	0.924	57	0.723	57
imitation and plastic jewellery	0.923	58	0.762	51
tomato	0.920	59	0.711	61
butter, margarine, cream	0.914	60	0.712	60
burka, chadar, ajrak etc	0.912	61	0.677	68
purchase of medicines	0.909	62	0.731	56
crockery & cutlery	0.908	63	0.712	59
other household	0.905	64	0.715	58
katha,choona	0.905	65	0.634	79
expense travelling by roads	0.904	66	0.681	66
other cereals product	0.898	67	0.699	62
gram whole	0.894	68	0.653	76
toothpaste & powder,	0.886	69	0.655	75
mango	0.886	70	0.659	73
peas, moongra	0.885	71	0.659	72
wool for sweaters, etc	0.885	72	0.690	63
fish (fresh, frozen, dried)	0.884	73	0.627	82
household cleaning articles	0.883	74	0.685	65
other expenditure	0.883	75	0.639	77
stationery supplies	0.881	76	0.626	83
pickles chatni etc	0.877	77	0.633	80
books and exercise books etc	0.877	78	0.639	78
melon (water, garma, sarda)	0.876	79	0.628	81
desi ghee	0.876	80	0.581	91
new and old ready-made, etc	0.876	81	0.685	64
electricity	0.870	82	0.656	74
curd/yogurt	0.869	83	0.563	95
biscuits (sweet & saltish)	0.868	84	0.591	89
eggs	0.866	85	0.615	85
dates	0.866	86	0.667	70
pan leaves	0.861	87	0.494	106
cinnamon, caraway, cardamom	0.859	88	0.568	92
suiji, maida, besan	0.858	89	0.606	86
ginger	0.858	90	0.566	94
other fresh fruits (pomgr,apri,jamor	0.856	91	0.617	84
guava	0.854	92	0.591	90
glucose, energile etc.	0.854	93	0.557	96
cake, bakerkhani	0.848	94	0.599	87
raisin, dates, apricot (dired)	0.847	95	0.548	98
gloves, handkerchief, etc	0.847	96	0.567	93
other education expenses	0.845	97	0.593	88
pan prepared	0.842	98	0.482	109
citrus fruit (mosummi, malta, kinno	0.841	99	0.543	99
canned fruits	0.830	100	0.667	71
salt (iodised)	0.823	101	0.528	101
banana	0.822	102	0.524	102
grapes	0.816	103	0.529	100
sonf suparee	0.816	104	0.466	112
chiken meat (fresh, frozen)	0.814	105	0.499	105
squashes and syrups (not medicated	0.808	106	0.493	107
expense travelling by train	0.808	107	0.453	114
annual license fees tv/vcr etc.	0.803	108	0.484	108
gas (pipe)	0.802	109	0.464	113
gas (cylinder)	0.799	110	0.403	125

Appendix 5.1 (contd.): Distributional Charachteristics of Items Consumed in Pakistan (2001- 02)

	Social Weights Based on			
	Low Inequality Aversion (v = 0.5)		High Inequality Aversion (v = 2.0)	
	d_i	Rank	d_i	Rank
rent free accommodation	0.795	111	0.551	97
other (almond, walnut, chilghoza, p	0.791	112	0.452	116
minor repair/maintenance	0.790	113	0.473	111
barfi, jalebi, other sweetmeats	0.787	114	0.435	118
owner occupied accomodation	0.785	115	0.514	103
mutton	0.782	116	0.437	117
legal expenses	0.782	117	0.405	124
apple	0.781	118	0.453	115
confectionery (toffee, chocolate, ch	0.780	119	0.481	110
expenditure on hobbies etc.	0.775	120	0.507	104
other like ferni, kheer, etc	0.773	121	0.385	129
brief cases, handbags etc.	0.773	122	0.395	127
puri, paratha, nan, roti, samosa etc.	0.762	123	0.379	133
summercartage rent	0.760	124	0.376	135
repair of personal effects	0.757	125	0.430	121
house rent	0.756	126	0.389	128
shampoo	0.753	127	0.373	136
prawn, shrimps or crabs (fresh, froz	0.752	128	0.371	137
carbonated beverages	0.752	129	0.401	126
cooking oils	0.750	130	0.356	140
cosmetics	0.750	131	0.406	123
dental care, teethcleaning	0.746	132	0.423	122
other baked & fried products	0.742	133	0.431	120
milk, powdered(for adults & childr	0.740	134	0.377	134
honey (fresh or processed)	0.728	135	0.363	138
school/college fees	0.721	136	0.346	141
sugarcane juice, other fresh juices)	0.718	137	0.339	143
other expenses	0.716	138	0.346	142
ice crem, kulfi	0.715	139	0.434	119
readymade meals purchased from o	0.713	140	0.384	130
milk packed by milk plant	0.707	141	0.383	131
other expenses on tyre etc.	0.704	142	0.381	132
subsidized house rent	0.703	143	0.282	146
storages, safe deposits etc	0.697	144	0.359	139
tickets for cinemas, etc	0.695	145	0.335	144
pastries, patties etc.	0.690	146	0.315	145
hostel expenses	0.680	147	0.255	149
bread, bun, sheermal	0.666	148	0.275	147
telephone, telegraph, postal, etc	0.645	149	0.220	150
insurance premium on vehicle etc	0.637	150	0.270	148
petrol/diesel charges	0.624	151	0.203	153
rent of tv/vcr/video etc	0.616	152	0.209	151
newspaper magazine, books	0.610	153	0.199	155
expenditure on air travelling etc.	0.606	154	0.199	154
fruit juices (packed), mineral water	0.593	155	0.206	152
jams,marmalades etc	0.570	156	0.158	159
pudding, jelly etc	0.555	157	0.167	158
dry cleaning, washing	0.542	158	0.178	156
tomato ketchup/pulp	0.536	159	0.130	160
paper napkins, wax papers etc.	0.517	160	0.172	157
coffee	0.470	161	0.113	161
beauty parlour services	0.464	162	0.074	163
wages & salary paid to servants	0.440	163	0.087	162
other (ovaltine, horlics, milo, comp	0.435	164	0.044	164

Source: Author's own calculation using HIES (2001-02)

Appendix 6.1: Import Content within Domestic Consumption (IMPCON) estimates

	Groups	HIES Item Codes	Aggregation Level	IMPCON (2001-02)	IMPCON (1990-91)
1.	Milk & Milk Products	1101 – 1104	Milk	0.0015	0.009
		1105 – 1109	Diary Products	0.0033	0.278
2.	All Kinds of Meat	1201 – 1207	Whole Group	0.00018	0.000026
3.	All Fruits & Nuts	1301 – 1402	Whole Group	0.0461	0.0283
4.	All Vegetables	1501: Potato	Potato	0.0132	
		1502: Onion	Onion	0.0303	
		1503 – 1510: Other Vegetables.	Whole Group	0.0504	0.0485
5.	All Spices	1601 – 1602, 1604 - 1608	Whole Group	0.120	0.2640
		1603	Chillies	0.027	
6.	Sugar & Sugar Products	1701 – 1706:	Whole Group	0.0381	0.1631
7.	Bev., spirit & vinegar	1801 - 1804	Whole Group	0.0024	0.00021
8.	Cereals	2101: Wheat & Wheat flour	Wheat	0.027	0.0778
		2102: Rice & Rice flour	Rice	0.0013	0.0000008
		2103: Maize, Barley, Jawar and Miller	Maize/Barley	0.011	0.00048
		2104: Suji, Maida, Besan	Cereal Group	0.021	0.0573
		2105: Other Cereal Products.	Cereal Group	0.021	0.0573
9.	Pulses	2201 – 2205: Pulses	Whole Group	0.158	0
		2206: Other Pulses		0.984	
10.	Edible Oils	2301 – 2304	Whole Group	0.351	0.4094
11.	Tea & Coffee	2401 – 2403	Whole Group	1.0	1.0
12.	Bread & Bakery Products	2501 – 2605	Whole Group	0.00046	0
13.	Cosmetics & Perfumes	2801 – 2902	Whole Group	0.406	0.0712
14.	Laundry	2903 – 3003	Whole Group	0.1765	0.0739

	Groups	HIES Item Codes	Aggregation Level	IMPCON (2001-02)	IMPCON (1990-91)
15.	Tobacco & Tobacco Manufactured	4101 – 4109	Whole Group	0.0011	0.0011
16.	Books, Newspaper & Magazine	5802 & 4203	Notebooks	0.1032	0.0605
			Newspaper etc.	0.364	0.0605
17.	Clothing/ Footwear/ Accessories	5101 – 5106, 5201 – 5202, 5301 – 5304	Whole Group	0.0104	0.0002
18.	Crockery/Cutlery	5501 - 5503	Whole Group	0.0466	0.0175
19.	Pharmaceutical Products	5601, 5604	Whole Group	0.2406	0.2502
20.	Petroleum Products	4301-4303	Whole Group (except 4304)	0.6286	0.9388

Source : Author's own calculations

Note: '1' here means item is fully imported while '0' means it is fully domestically produced and consumed.

Appendix 6.2: Custom Duty Rates for 2001-02 & 1990-91

HIES Codes	Items	Custom Duty Rates
	2001-02	
1101-1109	Milk and Milk Products	0.30
1201-1202	Beef & Mutton	0.10
1206-1207	Fish & prawn, shrimps etc.	0.10
1301-1310	Fresh Fruits:	0.30
1401-1402	Dry Fruits & Nuts	0.30
1501-1509	Vegetables	0.10
1601-1602	Salt	0.30
1604-1605	Turmeric, Coriander, Ginger, Garlic	0.40
1607-1702	Cinnamon, Caraway, Cardamom, other spices, Sugar, Gur/Shakkar	0.20
1703-1804	Honey, Confectionery, Barfi (etc.), Glucose, Non-Alcoholic Bev.	0.30
1203	Chicken Meat (fresh, frozen)	0.30
1204	Eggs	0.10
1205	Other poultry birds (ducks, quail, turkey etc.)	0.15
1510	Canned vegetables	0.30
1603	Chillies, red	0.10
1605	Ginger	0.20
2101	Wheat and Wheat flour	0.20
2102	Rice and rice flour	0.10
2103	Maize, Barley, Jawar and Millet (Whole and Flour)	0.05
2104	Suji, Maida, Besan	0.10
2105	Other cereals products (Vermicellies, Corn flakes, Noodles, Macronis, Spageite)	0.25
2201	Gram Whole (Black and White)	0.10
2202-2205	Dal chana, Mash, Moong, Masoor	0.20
2206	Other pulses	0.05
2301	Desi Ghee*	0.30
2302-2304	Vegetable Ghee, Cooking oil and other oils & fats*	0.49
2401-2605	Tea and Coffee, Baked and Fried Products, and Miscellaneous Food Items	0.30
2701	Fire wood	0.10
2702	Kerosene oil	0.05
2703-2704	Char coal , Coal hard & soft peat &	0.10
2706-2707	Gas (pipe) and Gas (cylinder)	0.10
2708	Electricity	0.05
2709	Match box, Candles, Mantle etc.	0.30
2710	Beggasses, Agricultural wastes for fuel purposes (cotton sticks,sawdust, shrubs, weeds, tobacco sticks, etc.)	0.10
2801-3003	Personal Care Articles, Personal Care Services and Household laundry Cleaning and Paper Articles	0.30
4101-4104	Cigarettes and lighters, Biri, Tobacco Raw and	0.30

HIES Codes	Items	Custom Duty Rates
	Pan prepared	
4106	Katha Choona	0.25
4107-4109	Betel Nut, Sonf Suparee and Chewing Tobacco & Snuf	0.30
4301-4304	Personal Transport and Traveling*	0.30
4203	Newspapers, magazines, novels, books	0.175
5101	Woolen Cloth	0.30
5103-5301	New Ready made & second hand garments, Burka, Chadar, ajrak, Clothing Supplies, Tailoring, footwear, Briefcase, hand bags, watch straps, belts etc.	0.30
5303-5304	Gloves, handkerchief, scarf, hats, ties, watches, clocks	0.30
5501-5503	Chinaware, Earthenware, Plastic ware etc. for daily use and other household effects	0.30
5601-5604	Pharmaceuticals*	0.10
701-706	Refrigerator, freezer, AC, Air Cooler, Fans, Geyser	0.30
708-713	Camera (still & movie), Cooking stove (range), Microwave Oven, Heater, Bicycle	0.30
716	TV	0.30
717-719	VCR, VCP, Receiver, De-coder, Radio, cassette player, compact disk player.	0.20
720	Vacuum cleaner	0.30
721	Sewing/knitting machine	0.10
722-723	Personal Computer and others	0.05
	1990-91	
1105	Butter, Margarine, Cream	0.86
1101-1104	Milk, Lassi, Milk (packed), Milk (powder)	0.60
1106-1109	Cheese, Curd/Yogurt, Ice cream, Others	1.0
1201-1203	Beef, Mutton and Chicken Meat	0.80
1204	Eggs	1.0
1205-1207	Other poultry birds, Fish, Prawns, Shrimps or Crabs	0.80
1301-1303	Banana, Citrus fruits, Apple	1.0
1304	Dates	0.20
1305-1402	Grapes, Mango, Melon, Guava, Other fresh fruits, canned fruits, and dry fruit	1.0
1501-1510	Vegetables	1.0
1601-1606	Salt, Chillies (red), Turmeric, Coriander Seed, Ginger and Garlic)	0.80
1607	Cinnamon, Caraway, Cardamom	0.40
1608	Salan Masalah/Other spices (Licorice root, Cumin seeds, Black pepper,Cloves, Mixed condiments)	0.80
1701-1705	Sugar, Honey and Sugar Preparations	1.0
1706	Glucose, Energile	0.60
1801-1802	Carbonated beverages and Squashes & Syrups (not medicated)	1.0
1804	Fruit juices (packed), Mineral water etc.	0.90

HIES Codes	Items	Custom Duty Rates
2101-2104	Cereals	0.40
2105	Other Cereals products	0.45
2301-2303	Edible Oils and Fats*	0.43
2304	Other edible Oils and Fats*	0.80
2401-2403	Tea and Coffee	1.0
2501-2606	Baked and Fried Products & Miscellaneous Food Items	1.0
2801-3001	Personal Care Articles, Personal Care Services and Laundry Soaps, bleach and other laundry articles	1.0
3003	Paper napkins, wax papers and other paper articles etc.	1.0
4101	Cigarettes and lighter	1.0
4102	Biri	0.80
4103	Tobacco Raw	0.50
4104	Pan Prepared	0.80
4106-4109	Katha Choona, Betel nut, Sonf Suparee and Chewing tobacco	0.80
4203	Newspapers, magazines, novels, books	1.0
4301-4303	Personal Transport and Traveling*	.086
5101-5106	Clothing, Clothing material and services	1.0
5201-5202	Footwear and repair charges	1.0
5301-5304	Personal effects and service and repair charges	1.0
5501	Crockery & Cutlery for daily use	0.45
5502	Earthenware (ghara, sorahi etc.), Glassware, Plastic-ware, Woodware and lacquer	.053
5503	Other household effects (bulbs, tubes, switches, battery cells, lamp shades etc.)	.045
5601-5604	Pharmaceuticals*	0.34
5802	Books and exercise note books / copies, stationary etc.	1.0
5805	Stationery supplies such as pen, pencils, stapling machine, pin etc.	0.80
708-709	Camera (movie & still)	0.50
710	Cooking stove	0.80
711	Cooking range & microwave oven	0.80
716	TV	0.80
717	VCR, VCP, Receiver, Decoder	0.80
718	Radio Cassette	1.0
720	Vacuum Cleaner	0.80
* Effective duty rate is used.		

Appendix 7.1: Price Elasticities: Estimates from First Stage (Unit Value and Share Equations)

	Notations
Dependent Variables	
Log of unit values	v_i
Budget Shares	w_i
Independent Variables	
Log of per capita total expenditure	β_i
Log of household size	z_{hh}
Ratio of male members less than 11 years of age to household size	z_{1M}
Ratio of male members less than 11-20 years of age to household size	z_{2M}
Ratio of male members less than 21-30 years of age to household size	z_{3M}
Ratio of male members less than 31-40 years of age to household size	z_{4M}
Ratio of male members less than 41-50 years of age to household size	z_{5M}
Ratio of male members less than 51+ years of age to household size	z_{6M}
Ratio of female members less than 11 years of age to household size	z_{1F}
Ratio of female members less than 11-20 years of age to household size	z_{2F}
Ratio of female members less than 21-30 years of age to household size	z_{3F}
Ratio of female members less than 31-40 years of age to household size	z_{4F}
Ratio of female members less than 41-50 years of age to household size	z_{5F}

Appendix 7.1 (Contd.): Price Elasticities Estimates from First Stage: Unit Value Equation

Unit Value Equation														
	Beef		Wheat		Rice		Veg. Ghee		Sugar		Milk		Pulses	
	Coeff.	t-val.	Coeff.	t-val.	Coeff.	t-val.	Coeff.	t-val.	Coeff.	t-val.	Coeff.	t-val.	Coeff.	t-val.
β_2	0.001633	0.62	-0.0033	0.296	0.130935	30.76	0.016533	7.51	-0.00121	-0.91	0.018822	5.6	0.216675	20.97
z_{hh}	0.001406	0.61	-0.01454	-4.87	0.056648	14	0.005929	3.03	-0.00073	-0.59	0.014919	4.51	0.231649	23.99
z_{1M}	-0.00553	-0.49	0.008384	0.65	-0.02578	-1.39	0.009829	1.09	-0.00476	-0.85	-0.01146	-0.81	-0.00722	-0.16
z_{2M}	-0.01279	-1.07	0.017272	1.25	-0.0609	-3.06	0.001751	0.18	0.003697	0.61	-0.01496	-0.99	-0.0289	-0.61
z_{3M}	-0.01412	-1.11	0.017678	1.19	-0.0462	-2.16	0.004373	0.42	-0.00275	-0.43	0.002652	0.17	-0.03891	-0.77
z_{4M}	-0.01761	-1.24	0.027185	1.6	-0.03695	-1.53	0.005622	0.47	0.000611	0.08	-0.01361	-0.77	-0.03881	-0.67
z_{5M}	0.010793	0.68	0.011757	0.63	0.018175	0.67	0.012628	0.96	0.006471	0.81	-0.01697	-0.89	-0.01827	-0.28
z_{6M}	-0.00762	-0.47	-0.0064	-0.36	-0.01936	-0.72	0.005072	0.4	0.005878	0.75	0.003951	0.21	-0.01041	-0.17
z_{1F}	-0.01158	-1.04	0.031377	2.44	0.003259	0.18	0.006708	0.75	-0.00223	-0.4	-0.01089	-0.77	0.009333	0.21
z_{2F}	-0.00318	-0.27	0.014362	1.05	-0.02392	-1.21	-0.0009	-0.09	-0.00521	-0.87	-0.01679	-1.11	0.038795	0.83
z_{3F}	0.015458	1.18	-0.00433	-0.29	-0.00501	-0.23	-0.00364	-0.34	-0.00328	-0.5	-0.00955	-0.58	0.04807	0.93
z_{4F}	0.005637	0.39	-0.01829	-1.06	-0.04273	-1.76	0.000999	0.08	-0.00371	-0.49	0.008977	0.48	-0.02498	-0.43
z_{5F}	0.01035	0.74	0.001063	0.06	-0.05703	-2.46	-0.00773	-0.66	-0.00214	-0.3	0.012494	0.68	-0.0205	-0.37
Source: Authors own estimates using HIES (2001-02)														

Appendix 7.1 (Contd.): Price Elasticities: Estimates from First Stage: Share Equation														
	Beef		**Wheat**		**Rice**		**Veg. Ghee**		**Sugar**		**Milk**		**Pulses**	
	Coeff.	**t-val.**	**Coeff.**	**t-val.**	**Coeff.**	**t-val.**	**Coeff.**	**t-val.**	**Coeff.**	**t-val.**	**Coeff.**	**t-val.**	**Coeff.**	**t-val.**
β_1	-0.00432	-9.7	-0.06089	-49.3	-0.00604	-10.25	-0.02373	-51.34	-0.01446	-32.82	0.002529	2.39	-0.00703	-37.33
z_{hh}	-0.00112	-2.73	-0.01579	-13.79	-0.00209	-3.83	-0.0087	-20.31	-0.00586	-14.36	0.001045	1.06	-0.00269	-15.43
z_{1M}	1.82E-05	0.01	-0.00685	-1.34	3.41E-05	0.01	-0.00083	-0.43	-0.00112	-0.61	-0.0011	-0.25	-0.00142	-1.81
z_{2M}	-0.00043	-0.21	0.005854	1.05	-4.1E-05	-0.02	0.004689	2.25	-0.00339	-1.71	-0.01185	-2.49	0.000128	0.15
z_{3M}	0.004616	2.19	-0.00595	-1.02	-0.00538	-1.93	0.003844	1.76	-0.00472	-2.26	-0.00834	-1.67	-0.00117	-1.32
z_{4M}	0.002914	1.24	-0.01618	-2.48	-0.00235	-0.75	-0.00133	-0.55	-0.00724	-3.11	-0.00191	-0.34	-0.00121	-1.22
z_{5M}	0.001746	0.66	-0.01395	-1.9	-0.00868	-2.49	-0.00168	-0.61	-0.00551	-2.11	-0.0059	-0.94	-0.0021	-1.88
z_{6M}	0.000213	0.08	-0.0117	-1.67	-0.01054	-3.15	-0.00145	-0.55	-0.00457	-1.83	0.003648	0.61	-0.00121	-1.14
z_{1F}	1.92E-05	0.01	-0.00463	-0.9	0.001172	0.48	-0.00066	-0.35	-0.00189	-1.03	0.00242	0.55	-0.00157	-2
z_{2F}	-0.00073	-0.37	0.004078	0.74	0.002339	0.89	0.004604	2.23	-0.00101	-0.52	-0.00203	-0.43	0.000413	0.49
z_{3F}	0.004805	2.19	-0.00502	-0.82	-0.00165	-0.57	0.006518	2.86	0.000418	0.19	0.009911	1.89	0.001396	1.5
z_{4F}	0.002634	1.05	0.007004	1.01	5.71E-05	0.02	0.00986	3.8	-0.00047	-0.19	-0.00396	-0.67	0.002285	2.16
z_{5F}	0.002922	1.2	0.017493	2.6	-0.0011	-0.34	0.008635	3.43	0.000478	0.2	-0.00608	-1.05	0.003552	3.46
Source: Authors own estimates using HIES (2001-02)														

Appendix 7.2: Estimates of Own- and Cross- Price Elasticities: Rural Pakistan (2001-02)

Appendix 7.2: Estimates of Own and Cross-Price Elasticities: Rural Pakistan (2001-02)

	Beef	Wheat	Rice	Veg_ghee	Sugar	Milk	Pulses
Beef	**-2.066**	**0.924**	**1.113**	**-0.863**	**-1.042**	**0.229**	**-0.346**
Wheat	**-1.015**	**0.566**	0.064	**0.668**	**-1.282**	0.705	0.120
Rice	**-1.416**	**2.590**	**-1.674**	**0.505**	**0.825**	0.070	**-0.522**
Veg_ghee	0.356	0.101	0.374	**-0.644**	0.066	**0.150**	0.047
Sugar	**-0.930**	**-0.361**	0.340	**1.218**	**-0.770**	**-0.202**	-0.036
Milk	0.021	**0.426**	-0.519	**0.349**	**-0.264**	**-1.041**	-0.017
Pulses	-0.049	0.143	0.225	**0.248**	**0.353**	**0.104**	**-0.477**

Source : Author's calculation using Household Income and Expenditure Survey, (2001-02).

Note 1/: The row shows the commodity being affected and the column the commodity whose price is changing. Bootstrapping standard errors are reported in parentheses and they are computed from 1,000 replication of the bootstrap using cluster specific information and are defined as half of the length of the interval around the bootstrap mean that contains 0.638 (the fraction of a normal random variable within two standard deviations of the mean) of the bootstrap replication [for example see Deaton (1997, p.71)].

2/ Figures in bold are greater in absloute value than twice their size of bootstrapped standard error (5% level of significance).

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